# PROCEEDINGS

OF THE

# AMERICAN SOCIETY

OF

# CIVIL ENGINEERS

(INSTITUTED 1852)

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VOL. XLI—No. 7

SEPTEMBER, 1915

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Edited by the Secretary, under the direction of the Committee on Publications.

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NEW YORK 1915

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# American Society of Civil Engineers

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*Term expires January, 1917:*
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TO INVESTIGATE CONDITIONS OF EMPLOYMENT OF, AND COMPENSATION OF, CIVIL ENGINEERS: Nelson P. Lewis, S. L. F. Deyo, Dugald C. Jackson, William V. Judson, George W. Tillson, C. F. Loweth, John A. Bensel.

TO CODIFY PRESENT PRACTICE ON THE BEARING VALUE OF SOILS FOR FOUNDATIONS, ETC.: Robert A. Cummings, Edwin Duryea, Jr., E. G. Haines, Allen Hazen, James C. Meem, Walter J. Douglas.

ON A NATIONAL WATER LAW: F. H. Newell, George G. Anderson, Charles W. Comstock, Clemens Herschel, W. C. Hoad, Robert E. Horton, John H. Lewis, Charles D. Marx, Gardner S. Williams.

ON FLOODS AND FLOOD PREVENTION: C. McD. Townsend, John A. Bensel, T. G. Dabney, C. E. Grunsky, Morris Knowles, J. B. Lippincott, Daniel W. Mead, John A. Ockerson, Arthur T. Safford, Charles Saville, F. L. Sellew.

TO REPORT ON STRESSES IN RAILROAD TRACK: A. N. Talbot, A. S. Baldwin, J. B. Berry, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, Robert W. Hunt, George W. Kittredge, Paul M. LaBach, C. G. E. Larsson, William McNab, G. J. Ray, Albert F. Reichmann, F. E. Turneaure, J. E. Willoughby.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER.....1446 Circle.
CABLE ADDRESS.....“Ceas, New York.”

* Vacancy in chairmanship caused by the death of Austin Lord Bowman.

Vol. XLI. SEPTEMBER, 1915. No. 7.

# AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

# PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

## SOCIETY AFFAIRS

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## MINUTES OF MEETINGS

### OF THE SOCIETY

**September 1st, 1915.**—The meeting was called to order at 8.30 P. M.; Director Arthur S. Tuttle in the chair; Chas. Warren Hunt, Secretary; and present, also, 123 members and 10 guests.

The minutes of the meetings of May 19th and June 2d, 1915, were approved as printed in the August, 1915, *Proceedings*.

A paper by H. R. Stanford, M. Am. Soc. C. E., entitled "Pearl Harbor Dry Dock" was presented by the author and illustrated with lantern slides.

The Secretary announced that he had received written communications on the subject from Messrs. F. R. Harris, Harrison S. Taft, C. E. Fowler, W. F. Frear, and P. L. Reed.

A paper by E. E. Howard, M. Am. Soc. C. E., entitled "The Twelfth Street Trafficway Viaduct, Kansas City, Missouri", was presented by the author and illustrated with lantern slides.

The paper was discussed by Messrs. M. M. Upson, and T. Kennard Thomson. The Secretary presented communications on the subject from Messrs. F. W. Green, L. J. Mensch, and H. W. Holmes, and the author replied briefly.

The Secretary presented the following report of the Tellers appointed to canvass the letter-ballot on the question:

"Shall the action of the Society on January 18th, 1911: 'That it is the sense of this meeting that the licensing of Engineers by States is undesirable' be rescinded?"

| | | | |
|---|---|---|---|
| Total number of ballots received | | | 2 879 |
| Ballots from members in arrears of dues | 230 | | |
| Ballots blank | 8 | | |
| Ballots marked "?" | 4 | | |
| Ballots unsigned | 17 | | |
| Ballots stamped, not signed | 4 | 263 | |
| Ballots counted | | | 2 616 |
| Number voting "Yes" | 1 195 | | |
| " " "Yes" with remarks | 29 | 2 024 | |
| " " "No" | 579 | | |
| " " "No" with remarks | 13 | 592 | 2 616 |

Respectfully submitted,

CHAS. WARREN HUNT,
LINCOLN BUSH.

The chair declared that the action of the Society in this matter at the Annual Meeting of January 18th, 1911, had been rescinded.

At the request of J. H. Gandolfo, Assoc. M. Am. Soc. C. E., the Secretary presented a letter from him commenting on the wording of the letter-ballot relating to the licensing of engineers.

No action was taken.

The Secretary announced the election of the following candidates on August 31st, 1915:

AS MEMBERS

RICHARD BEYER, Hoboken, N. J.
WILLIAM GEORGE BLIGH, Toronto, Ont., Canada
THOMAS HENRY CARVER, Seattle, Wash.
OLIVER HAMLINE DICKERSON, Duluth, Minn.
SAMUEL FORTIER, Washington, D. C.
CLINTON HALL KEARNY, San Antonio, Tex.

JOHN ALEXANDER MCGREW, Albany, N. Y.
JOSEPH S MORRISON, Ottumwa, Iowa
LOUIS HENRY PRELL, New Richmond, Ohio
ORVILLE CAMPBELL SKINNER, Burnham, Pa.
GEORGE PLINY SMITH, Cincinnati, Ohio
JAY L STANNARD, Portland, Ore.

AS ASSOCIATE MEMBERS

EDWIN LEARNED ADAMS, Los Angeles, Cal.
EDMUND OLIVER ARCHIBALD, Ship Creek, Alaska
FRANK ARTHUR BANKS, Moran, Wyo.
ARCHER FORTESCUE BARNARD, Los Angeles, Cal.
EDWARD VAHAN BARON, Yuma, Ariz.
HAROLD INGERSOLL BELL, Portland, Me.
GEORGE HERBERT BILES, Harrisburg, Pa.
JAMES ALPHONSUS BOYLE, Wilkes-Barre, Pa.
WALTER THOMPSON BROOKS, Kansas City, Mo.
ROY WILSON BURKS, Louisville, Ky.
GEORGE RAYMOND CAMPBELL, Spokane, Wash.
CHARLES ANDREW CASE, Joplin, Mo.
GERALD OTLEY CASE, New York City
HERBERT AUGUSTINE CLAIBORNE, JR., Richmond, Va.
LELAND CLAPPER, Two Harbors, Minn.
HARRY LEE CLARKE, Mechanicville, N. Y.
HENRY EDWARD COANE, Melbourne, Victoria, Australia
RICHARD EARL COTTON, Chicago, Ill.
JOHN FRANCIS COVERT, San Diego, Cal.
ARTHUR EMMETT COWELL, Merced, Cal.
GEORGE SOLOMON CRITES, Tucson, Ariz.
THOMAS FRANCIS CURRAN, Utica, N. Y.
WILLIAM JAMES DAVIS, Winnipeg, Man., Canada
ARVIN J DILLENBECK, Buffalo, N. Y.
JOSEPH FRANCIS SINNOTT DONNELLY, Camagüey, Cuba
WILLIAM DYER, Mt. Vernon, Ohio
JOHN FARRIS, Pittsburgh, Pa.
RAMIRO ANTONIO FERNANDEZ, New York City
GEORGE FUCHS, Tampa, Fla.
FRED BACON GREENLEAF, Auburn, Me.
HOMER HUSTON HAGGARD, Havana, Cuba
PHILIP JEWETT HALE, Chicago, Ill.
GEORGE WASHINGTON HAND, Chicago, Ill.
LUKE JOSEPH HAYES, Niagara Falls, N. Y.
WALTER LEO HEMPELMANN, St. Louis, Mo.
HARRY ANDERSON HICKMAN, Vandalia, Ill.
GEORGE LEYBURN HUGHES, Norfolk, Va.

ANDREW P HUSTAD, Minneapolis, Minn.
ANDREW WILLIAM JACKMAN, New Orleans, La.
THOMAS MCLEAN JASPER, London, England
YEIZO KASANO, Kobé, Japan
EARL WALLACE KELLY, Duluth, Minn.
EDGAR AUGUSTUS KIMMEL, Lithia Springs, Ga.
EMANUEL CARL HJALMAR KLINGBERG, Troy, N. Y.
WILLIAM FRANKLIN KRAHL, JR., Chicago, Ill.
HERBERT JOHN KUELLING, Milwaukee, Wis.
KARL BARCLAY KUMPE, Victoria, B. C., Canada
ALBERT LARSEN, Millville, Mass.
RUDOLPH WENDELL PHILLIPS LEBARON, Chicago, Ill.
CHARLES GRANVILLE LEWIS, San Francisco, Cal.
DANIEL COLLINS LIPSCOMB, Denison, Tex.
JOHN LODGE, Brooklyn, N. Y.
OSWALD LUPINSKI, Wilkinsburg, Pa.
ROBERT MACMINN, Pittsburgh, Pa.
ROSSITER MAGERS MCCRONE, Bangkok, Siam
HARRY FONTAINE MCFARLAND, JR., St. Louis, Mo.
ROGER KEYS MCGEE, Pittsburgh, Pa.
ERNEST MARTIN MERRILL, Beckley, W. Va.
CLIFFORD BENNETT MOORE, Long Island City, N. Y.
SAMUEL ROY MORROW, Jefferson City, Mo.
FRANK TIEBOUT MYERS, Hattiesburg, Miss.
ARTHUR THEODORE NABSTEDT, Schenectady, N. Y.
GEORGE ALEXANDER NOREN, Beacon, N. Y.
ROBERT PRESTON PARKER, Fort Smith, Ark.
ALOIS PHILLIP POIROT, Belleville, Ill.
JOHN FREDERICK POLAND, Cleveland, Ohio
JOHN IGNATIUS QUINN, Payson, Utah
JESSE STEELE RITCHEY, Towanda, Pa.
JAMES WYNBOURNE ROUTH, East Rochester, N. Y.
CHARLES ADRIAN SAWYER, JR., Waban, Mass.
GEORGE FUERLE SCHLESINGER, Columbus, Ohio
LEON MONROE SCHOONMAKER, Flushing, N. Y.
HOWARD DANIEL SEVERANCE, Monterey, Cal.
WALTER TAYLOR SHULTZ, Baltimore, Md.
ARTHUR PHILIP SKAER, Buffalo, N. Y.
NORTON QUINCY SLOAN, Dayton, Ohio
LLOYD SMOYER, New York City
PAUL BERTRAM SPENCER, West Haven, Conn.
JOHN STEARNS, Los Angeles, Cal.
JOHN BERNARD STEIN, Brooklyn, N. Y.
JAMES CAD TERRY, Curityba, Parana, Brazil
CHARLES MELVILLE UPHAM, Wilmington, Del.
CHARLES JOSEPH WEAVER, Savannah, Ga.

BARCLAY WHITE, Philadelphia, Pa.
GEORGE PHILIP WINN, Nashua, N. H.
ROBERT LEE WOOD, El Monte, Cal.
THOMAS TEMPLE WRIGHT, Chattanooga, Tenn.

AS ASSOCIATES

EDWARD ALFRED PLATH, Bartow, Fla.
JOHN MILTON RITCHIE, Philadelphia, Pa.

AS JUNIORS

JOHN EDWARD ANDERSON, London, England
ETHELBERT BACON, New York City
ALFRED ABRAHAM BERKWITZ, New York City
HARRY WALDO COLE, Iroquois Falls, Ont., Canada
HOLTON COOK, Louisville, Ky.
GEORGE BURRETT DAVIDSON, Iroquois Falls, Ont., Canada
CHARLES EDMUND DELEUW, Chicago, Ill.
WILLIAM CHARLES DIEHL, Cali, Colombia
CHARLES WILLIAM DOERR, Cleveland, Ohio
BENJAMIN GOODMAN, New York City
WELLESLEY CARL HARRINGTON, Albany, N. Y.
GEORGE ALFRED HELMSTETTER, Syracuse, N. Y.
HAROLD FISKE HOLLEY, Williams, Cal.
WILLIAM DUDLEY HUNT, Galveston, Tex.
BOYLE IRWIN, Philadelphia, Pa.
LAWRENCE WILSON KINNEAR, New York City
CHARLES KIRSCHNER, New York City
HARRY RAYMOND LEACH, Saginaw, Mich.
RAYMOND MARX, New York City
ALBERT EMERSON MELLON, Tampa, Fla.
CHARLES HAROLD MUNSON, Berkeley, Cal.
JAMES CARROLL MURTON, Toronto, Ont., Canada
CHARLES FRANKLIN REANEY, Waterloo, Iowa
ERIC HOUGHTON RHODES, Brisbane, Australia
WILLIAM ERNEST ROBINSON, Springfield, Mo.
GARLAND LIVINGSTONE ROUNDS, Walnut, Iowa
HENRY AYLESBURY STRINGFELLOW, Rochester, N. Y.
GEORGE EDWARD WARREN, Baltimore, Md.
FRANK IGNATIUS WHEELER, JR., Towson, Md.
EMMET CHEATHAM WILSON, Savannah, Ga.

The Secretary announced the transfer of the following candidates on August 31st, 1915:

FROM JUNIOR TO ASSOCIATE MEMBER

NORMAN NATHANIEL BARBER, Ottumwa, Iowa
HARRY MONTEFIORE BERGMAN, New York City

RALPH MCLANE BOWMAN, Indianapolis, Ind.
MEYER DAVIS, Pittsburgh, Pa.
FRANCIS BONNER FORBES, New York City
FREDERICK SHELTON FOULKROD, Pittsburgh, Pa.
SAMUEL GORDON, San Diego, Cal.
GUY ALEXANDER GRAHAM, New York City
ARTHUR BROOKS GREEN, Portland, Me.
ARNOLD CHARLES KELLERSBERGER, Houston Heights, Tex.
WALTER HARLAN LECKLITER, Corning, Iowa
HARRIE LANGDON MUCHEMORE, San Francisco, Cal.
LEON BENEDICT REYNOLDS, Kansas City, Mo.
ANDREW PEACH ROLLINS, Natalia, Tex.
JAMES ALFRED SILSBEE, Elmira, N. Y.
EDWARD HAZZARD WEST, Louisville, Ky.
HENRY BELCHER WHEATCROFT, JR., New York City
HAROLD IRA WOOD, Richmond, Cal.

FROM JUNIOR TO ASSOCIATE

CARL SWEETLAND REED, New York City

The Secretary announced the following deaths:

AUSTIN LORD BOWMAN, of New York City, elected Associate Member, September 7th, 1892; Member, December 1st, 1897; died June 3d, 1915.

DEXTER BRACKETT, of Boston, Mass., elected Member, June 6th, 1888; died August 26th, 1915.

LOOMIS EATON CHAPIN, of Canton, Ohio, elected Junior, December 3d, 1884; Associate Member, September 7th, 1892; Member, November 4th, 1896; died June 21st, 1915.

MENDES COHEN (*Past-President*), of Baltimore, Md., elected Member, December 4th, 1867; died August 13th, 1915.

HERBERT WHEELER COWAN, of Denver, Colo., elected Member, June 3d, 1908; died May 29th, 1915.

*Sir* SANDFORD FLEMING, of Ottawa, Ont., Canada, elected Member, September 18th, 1872; died July 22d, 1915.

JOHN CHARLES WILLIAM GRETH, of Pittsburgh, Pa., elected Member, March 4th, 1913; died August 7th, 1915.

WILLIAM MACKENZIE HUGHES, of Chicago, Ill., elected Member, June 2d, 1880; died June 25th, 1915.

CHARLES CLEMONS ROSE, of Scranton, Pa., elected Member, April 4th, 1888; died July 17th, 1915.

HIRAM EVERETT TERRY, of Flint, Mich., elected Member, June 6th, 1911; died March 8th, 1915.

CHARLES DOD WARD, of New York City, elected Member, March 3d, 1869; died July 30th, 1915.

FRANK ROBERT WILLIAMSON, of Chicago, Ill., elected November 7th, 1906; died July 11th, 1915.

JAMES WILHELM CARPENTER, of Cleveland, Ohio, elected Junior, February 28th, 1911; Associate Member, June 24th, 1914; died June 10th, 1915.

JAMES BLAINE MILLER, of Washington, D. C., elected Associate Member, April 2d, 1913; died May 18th, 1915.

JOHN HAINES WARDER, of Chicago, Ill., elected Associate, March 7th, 1888; died August 30th, 1915.

HAROLD CROSBY STEVENS, of Charlotte, N. C., elected Junior, December 31st, 1913; died May 23d, 1915.

Adjourned.

## ANNOUNCEMENTS

**The House of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.**

### FUTURE MEETINGS

**October 6th, 1915.—8.30 P. M.**—This will be a regular business meeting. A paper by John Vipond Davies, M. Am. Soc. C. E., entitled "The Astoria Tunnel Under the East River for Gas Distribution in New York City", will be presented for discussion.

This paper was printed in *Proceedings* for August, 1915.

**October 20th, 1915.—8.30 P. M.**—At this meeting, a paper by F. zur Nedden, Esq., entitled "Induced Currents of Fluids", will be presented for discussion.

This paper was printed in *Proceedings* for August, 1915.

**November 3d, 1915.—8.30 P. M.**—A regular business meeting will be held, and a paper by Karl R. Kennison, Assoc. M. Am. Soc. C. E., entitled, "The Hydraulic Jump, in Open-Channel Flow at High Velocity", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

**November 17th, 1915.—8.30 P. M.**—At this meeting a paper by Edwin Duryea, Jr., M. Am. Soc. C. E., and H. L. Haehl, Assoc. M. Am. Soc. C. E., entitled "A Study of the Depth of Annual Evaporation from Lake Conchos, Mexico", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

### SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

In making a search it sometimes happens that references are found which are not readily accessible to the person for whom the search is made. In that case the material may be reproduced by photography, and this can be done for members at the cost of the work to the Society, which is small. This method is particularly useful when there are drawings or figures in the text, which would be very expensive to reproduce by hand.

## PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which from their mathematical or technical nature, in the opinion of the Committee are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 429 of the August, 1913, *Proceedings*.

## LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

### San Francisco Association

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at

6 P. M., at the Palace Hotel, on the third Friday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M., every Wednesday, and the place of meeting may be ascertained by communicating with the Secretary of the Association, E. T. Thurston, Jr., 713 Mechanics' Institute, 57 Post Street.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

**Colorado Association**

The meetings of the Colorado Association of Members of the American Society of Civil Engineers (Denver, Colo.) are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary, L. R. Hinman, 1400 West Colfax Ave., Denver, Colo. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesdays, at 12.30 P. M., at the Albany Hotel.

Visiting members are urged to attend the meetings and luncheons.

**Atlanta Association**

The Atlanta Association of Members of the American Society of Civil Engineers was organized on March 14th, 1912. The Association holds its meetings at the University Club, Atlanta, Ga.

At the meeting of the Association on January 9th, 1915, the following officers were elected for the ensuing year: President, Park A. Dallis; First Vice-President, B. M. Hall; Second Vice-President, P. H. Norcross; Secretary-Treasurer, T. B. Branch.

**Baltimore Association**

On May 6th, 1914, the Baltimore Association of Members of the American Society of Civil Engineers was organized, a Constitution adopted, and the following officers were elected: J. E. Greiner, President; Francis Lee Stuart, First Vice-President; L. H. Beach, Second Vice-President; Harry D. Williar, Jr., Secretary-Treasurer; and Messrs. H. D. Bush, B. T. Fendall, B. P. Harrison, Calvin W. Hendrick, Oscar F. Lackey, M. A. Long, and A. A. Thompson, Directors.

At its meeting of September 2d, 1914, the Board of Direction considered and approved the proposed Constitution of the Baltimore Association of Members of the American Society of Civil Engineers.

**Cleveland Association**

The proposed Constitution of the Cleveland Association of Members of the American Society of Civil Engineers was considered and approved by the Board of Direction of the Society on January 6th, 1915.

The following officers have been elected: President, Willard Beahan; Vice-President, Robert Hoffmann; Secretary-Treasurer, George H. Tinker.

**Louisiana Association**

At the meeting of the Louisiana Association of Members of the American Society of Civil Engineers (New Orleans, La.), on April 14th, 1915, the following officers were elected for the ensuing year: J. F. Coleman, President; W. B. Gregory and A. M. Shaw, Vice-Presidents; Ole K. Olsen, Treasurer; and E. H. Coleman, Secretary.

**Northwestern Association**

The proposed Constitution of the Northwestern Association of Members of the American Society of Civil Engineers (St. Paul and Minneapolis, Minn.) was considered and approved by the Board of Direction of the Society on November 4th, 1914. F. W. Cappelen is President and R. D. Thomas, Secretary.

**Philadelphia Association**

The meetings of the Philadelphia Association of Members of the American Society of Civil Engineers are held at the Engineers' Club of Philadelphia, 1317 Spruce Street.

The officers of the Association are as follows: President, Richard L. Humphrey; Vice-Presidents, F. Herbert Snow and Edgar Marburg; Directors, John Sterling Deans, J. W. Ledoux, H. H. Quimby, and H. S. Smith; Treasurer, S. M. Swaab; and Secretary, W. L. Stevenson.

**Portland, Ore., Association**

At the meeting of the Association on October 21st, 1914, the following officers were elected for the ensuing year: President, George C. Mason; First Vice-President, W. S. Turner; Second Vice-President, John T. Whistler; Treasurer, G. B. Hegardt; and Secretary, Charles J. McGonigle.

**St. Louis Association**

The proposed Constitution of the St. Louis Association of Members of the American Society of Civil Engineers was considered and approved by the Board of Direction of the Society on October 7th, 1914.

The following officers have been elected: President, J. A. Ockerson; First Vice-President, Edward E. Wall; Second Vice-President, F. J. Jonah; Secretary-Treasurer, Gurdon G. Black. The meetings of the Association are held at the Engineers' Club Auditorium.

**San Diego Association**

The San Diego Association of Members of the American Society of Civil Engineers was organized on February 5th, 1915, and officers have been elected, as follows: President, George Butler; Vice-President, Willis J. Dean; and Secretary-Treasurer, J. R. Comly.

**Seattle Association**

The Seattle Association of Members of the American Society of Civil Engineers was organized on June 30th, 1913. At its meeting of January 25th, 1915, the following officers were elected for the ensuing year: President, R. H. Ober; Vice-President, A. S. Downey; and Secretary-Treasurer, Carl H. Reeves.

(Abstract of Minutes of Meetings)

**July 26th, 1915.**—The meeting was called to order at 12.15 P. M., at the College Club; A. S. Downey, Vice-President, in the chair; Carl H. Reeves, Secretary; and present, also, 29 members and guests.

The special order of business for the meeting being further discussion of the Articles of Association of The Associated Engineering Societies of Seattle, the Secretary read the Amendments presented by Mr. A. H. Fuller, at the meeting of June 28th, 1915. The discussion was opened by Mr. Fuller, who was followed by Messrs. Hedges, Hall, Gray, Downey, Howes, Dimock, and Tucker.

A vote on the Amendments, section by section, was called for, but a difference of opinion having developed as to whether affiliation such as that outlined by the Articles of Association was desired, a substitute motion was made by Mr. A. H. Dimock as follows:

"That this organization again endorses the principle of organizing the engineers of the City, and re-refers the matter to our Conference Committee to bring back a more specific arrangement with the Engineers' Club."

This motion, being duly seconded, was carried by a vote of 12 to 11, the deciding vote being cast by the Chair.

Mr. Hedges then moved "That it is the sense of this Association that we do not go into the Engineers' Club or any other amalgamation, except as each affiliated society goes into the amalgamation as a group". The motion was duly seconded.

On motion, it was decided to adjourn the meeting until August 2d, 1915, the hour and place to be arranged by the Secretary.

**August 2d, 1915 (Adjourned Meeting).**—The meeting was called to order at 8.00 P. M., in the New Seattle Chamber of Commerce; President R. H. Ober in the chair; Carl H. Reeves, Secretary; and present, also, 17 members and guests.

The minutes of the meetings of June 28th, and July 26th, 1915, respectively, were read and approved.

Mr. S. H. Hedges withdrew the motion *in re* amalgamation with other engineering societies of Seattle, offered by him at the meeting of July 26th, which was before that meeting at its adjournment.

Mr. B. D. Dean read an excerpt from an address by Charles Warren Hunt, Secretary of the Society, *in re* the co-operation of engineers, and supplemented the reading with a few remarks.

In accordance with the action of the Association at its meeting of July 26th, 1915, the Conference Committee presented a report containing certain changes and additions to the Articles of Association of The Associated Engineering Societies of Seattle, and the resolution of adoption was read by Robert Howes, Chairman of the Committee. The adoption of the Committee's report was moved by Mr. John L. Hall and seconded by Mr. Howes. The debate on the motion was opened by Mr. Hall, others discussing the subject being Messrs. Reeves, Herring, Hussey, Jacobs, Hedges, Fuller and Powell.

On motion by Mr. Joseph Jacobs, the following substitute was adopted:

"That this organization favor the formation of an association of engineering societies of Seattle, and that the sub-committee be enlarged

and authorized to recast the constitution submitted here this evening, changing it in so far as it refers to the special relationship with The Engineers' Club."

This motion was duly seconded, and the previous motion for the adoption of the report of the Conference Committee having been withdrawn, was carried.

President Ober appointed Messrs. Jacobs and Hedges as the additional members of the Conference Committee.

Adjourned.

### Southern California Association

The Southern California Association of Members of the American Society of Civil Engineers (Los Angeles, Cal.) holds regular bimonthly meetings, with banquet, on the second Wednesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M. every Wednesday, and the place of meeting may be ascertained from the Secretary of the Association, W. K. Barnard, 514 Central Building, Los Angeles, Cal.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in Los Angeles, and any such member will be gladly welcomed as a guest at any of the meetings or luncheons.

### Spokane Association

The proposed Constitution of the Spokane Association of Members of the American Society of Civil Engineers was considered and approved by the Board of Direction of the Society on March 4th, 1914. Ulysses B. Hough is President.

### Texas Association

The proposed Constitution of the Texas Association of Members of the American Society of Civil Engineers was considered and approved by the Board of Direction of the Society on December 31st, 1913. The headquarters of the Association is Dallas, Tex. John B. Hawley is President.

### Special Committee on Materials for Road Construction

**July 7th, 1915.**—The meeting was held at the House of the Society. Present, W. W. Crosby (Chairman), H. K. Bishop, A. W. Dean, Nelson P. Lewis, Charles J. Tilden, George W. Tillson, and A. H. Blanchard (Secretary).

The minutes of the meeting of May 24th, 1915, were read and approved.

Mr. Lewis reported for the Sub-committee on Cost Data, and presented for consideration a form covering cost data for any type of road or pavement. The form was adopted as amended.

Mr. Tillson presented a progress report for the Sub-committee on Tests and Analyses.

It was decided to hold the next meeting of the Committee at the House of the Society at 9.30 A. M., on August 13th, 1915.

**August 13th, 1915.**—The meeting was held at the House of the Society. Present, W. W. Crosby (Chairman), H. K. Bishop, A. W. Dean, Nelson P. Lewis, Charles J. Tilden, George W. Tillson, and A. H. Blanchard (Secretary).

The minutes of the meeting of July 7th, 1915, were read and approved as amended.

Mr. Lewis, Chairman of the Sub-committee on Cost Data, presented a revised form covering cost data for any type of road or pavement under the following headings: foundation, wearing course, traffic data, and yearly cost per square yard. The form was discussed in detail, and certain amendments relative thereto were presented and adopted. On motion, duly seconded, the form was adopted and referred to the Sub-committee on Forms.

Mr. Crosby presented a tentative draft of the 1916 Report, and pages 1 to 4 were thoroughly discussed, amended, and tentatively approved.

On motion, duly seconded, the Chairman was directed to appoint sub-committees, each to consist of one member, to submit conclusions pertaining to the use of the following non-bituminous road materials: broken stone, broken slag, gravel, cement-concrete, paving brick, wood block, and stone block, and that each sub-committee forward its conclusions to the Secretary on or before September 15th, 1915.

The Chairman appointed the Sub-committees as follows: On Gravel, Mr. Bishop; on Broken Stone and Broken Slag, Mr. Dean; on Paving Brick, Mr. Lewis; on Cement-Concrete, Mr. Tilden; on Wood Block, Mr. Tillson; and on Stone Block, Mr. Blanchard.

Mr. Tillson, Chairman of the Sub-committee on Tests and Analyses, presented a report covering lists of tests to be made on each of the several non-bituminous highway materials, and methods for conducting tests. After discussion, the report was tentatively approved as amended.

It was decided to hold the next meeting of the Committee at the House of the Society at 9.00 A. M., on October 23d, 1915.

## PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms, and at all meetings:

**American Institute of Mining Engineers,** 29 West Thirty-ninth Street, New York City.

**American Society of Mechanical Engineers,** 29 West Thirty-ninth Street, New York City.

**Architekten-Verein zu Berlin,** Wilhelmstrasse 92, Berlin W. 66, Germany.

**Associação dos Engenheiros Civis Portuguezes,** Lisbon, Portugal.

**Australasian Institute of Mining Engineers,** Melbourne, Victoria, Australia.

**Boston Society of Civil Engineers,** 715 Tremont Temple, Boston, Mass.

**Brooklyn Engineers' Club,** 117 Remsen Street, Brooklyn, N. Y.

**Canadian Society of Civil Engineers,** 176 Mansfield Street, Montreal, Que., Canada.

**Civil Engineers' Society of St. Paul,** St. Paul, Minn.

**Cleveland Engineering Society,** Chamber of Commerce Building, Cleveland, Ohio.

**Cleveland Institute of Engineers,** Middlesbrough, England.

**Dansk Ingeniorforening,** Amaliegade 38, Copenhagen, Denmark.

**Detroit Engineering Society,** 46 Grand River Avenue, West, Detroit, Mich.

**Engineers and Architects Club of Louisville,** 1412 Starks Building, Louisville, Ky.

**Engineers' Club of Baltimore,** 6 West Eager Street, Baltimore, Md.

**Engineers' Club of Minneapolis,** 17 South Sixth Street, Minneapolis, Minn.

**Engineers' Club of Philadelphia,** 1317 Spruce Street, Philadelphia, Pa.

**Engineers' Club of St. Louis,** 3817 Olive Street, St. Louis, Mo.

**Engineers' Club of Toronto,** 96 King Street, West, Toronto, Ont., Canada.

**Engineers' Club of Trenton,** Trent Theatre Building, 12 North Warren Street, Trenton, N. J.

**Engineers' Society of Northeastern Pennsylvania,** 415 Washington Avenue, Scranton, Pa.

**Engineers' Society of Pennsylvania,** 31 South Front Street, Harrisburg, Pa.

**Engineers' Society of Western Pennsylvania,** 2511 Oliver Building, Pittsburgh, Pa.

**Institute of Marine Engineers,** The Minories, Tower Hill, London, E., England.

**Institution of Engineers of the River Plate,** Calle 25 de Mayo 195, Buenos Aires, Argentine Republic.

**Institution of Naval Architects,** 5 Adelphi Terrace, London, W. C., England.

**Junior Institution of Engineers,** 39 Victoria Street, Westminster, S. W., London, England.

**Koninklijk Instituut van Ingenieurs,** The Hague, The Netherlands.

**Louisiana Engineering Society,** State Museum Building, Chartres and St. Ann Streets, New Orleans, La.

**Memphis Engineers' Club,** Memphis, Tenn.

**Midland Institute of Mining, Civil and Mechanical Engineers,** Sheffield, England.

**Montana Society of Engineers,** Butte, Mont.

**North of England Institute of Mining and Mechanical Engineers,** Newcastle-upon-Tyne, England.

**Oesterreichischer Ingenieur- und Architekten-Verein,** Eschenbachgasse 9, Vienna, Austria.

**Oregon Society of Civil Engineers,** Portland, Ore.

**Pacific Northwest Society of Engineers,** 312 Central Building, Seattle, Wash.

**Rochester Engineering Society,** Rochester, N. Y.

**Sachsischer Ingenieur- und Architekten-Verein,** Dresden, Germany.

**Sociedad Colombiana de Ingenieros,** Bogota, Colombia.

**Sociedad de Ingenieros del Peru,** Lima, Peru.

**Societe des Ingenieurs Civils de France,** 19 rue Blanche, Paris, France.

**Society of Engineers,** 17 Victoria Street, Westminster, S. W., London, England.

**Svenska Teknologforeningen,** Brunkebergstorg 18, Stockholm, Sweden.

**Tekniske Forening,** Vestre Boulevard 18–1, Copenhagen, Denmark.

**Western Society of Engineers,** 1737 Monadnock Block, Chicago, Ill.

# ACCESSIONS TO THE LIBRARY

(From July 26th to September 1st, 1915)

## DONATIONS*

### MODERN BRITISH PERMANENT WAY:

Treating of Rails, Chairs, Fishbolts, Fishplates, Keys, Sleepers, Ballast, Rail-Joints, Points and Crossings, etc. By Cecil J. Allen. Cloth, 10½ x 8¼ in., illus., 17 + 147 pp. London, The Railway News, 1915. 6 shillings.

The subject-matter contained in this book was published, it is stated, as a series of articles in the *Railway News*, between 1911 and 1914. It has now been completely revised and brought up to date, and illustrations have been added. In it the author describes, it is said, in a comprehensive manner, the design of the various details which go to make up the completed track, together with the processes of their manufacture, as well as their possibilities and limitations. The book is intended, it is stated, for those engaged in permanent way drafting, who are not familiar with the details of design and manufacture. The Contents are: The History and Development of the Modern Bull-Headed Steel Rail; The Manufacture and Composition of Rail Steel; The Rolling, Testing and Inspection of Steel Rails; Fishplates; Fish-Bolts; The Design of Chairs; The Manufacture of Cast-Iron Chairs; Keys; Chair Fastenings; The Selection of Timber for Sleepers; The Preparation and Preservative Treatment of Sleepers; Ballast; Rail-Joints, Creep, and the Spacing of Sleepers; The Design of Switches; Examples of Switch Practice; Three-Throw Switches; Types of Crossings; The Design of Crossings; Examples of Crossing Practice; Slip Roads and Scissors Crossings; Manganese Steel Switches and Crossings; Appendix: Revised British Standard Specification for Fishplates, December, 1914.

### ELECTRIC ELEVATORS: THEIR CONSTRUCTION AND OPERATION.

By Elmer G. Henderson. Paper, 7½ x 5 in., illus., 90 pp. Chicago, The Branch Publishing Company, 1915. $1.00.

The subject-matter of this book, it is stated, is devoted to detailed descriptions, with numerous illustrations, of the construction and operation of the various types of electric elevators for passenger and freight service, as well as of the kinds of motors to be used, the controllers, governors, etc. The author has included in his text the Chicago building ordinance of 1913 regulating the construction and maintenance of passenger and freight elevators, and, for ready reference, has given fourteen tables which contain data as to motor currents, sizes of wire, fuses, etc., for use in the various types of installations. The Contents are: Parts and Classes of Elevators; Direct Connected Electric Elevators; Counterbalancing of Electric Elevators; Direct Current Elevator Motors; Alternating Current Elevator Motors; Direct and Alternating Current Elevator Controllers; Design and Operation of a Modern Controller; Construction and Operation of Controllers; Governors; Automatic or Push-Button Elevators; Building Ordinances; Useful Tables; Index.

### THE NAVAL POCKET-BOOK, 1915.

Founded by *Sir* W. Laird Clowes. Edited by R. C. Anderson. Twentieth Year. Cloth, 5¼ x 3¾ in., illus., 29 + 716 pp. London, W. Thacker & Co.; Calcutta and Simla, Thacker, Spink & Co., 1915. 7 shillings 6 pence.

As stated in the title, this volume is a pocket-book of the navies of the world corrected to April 7th, 1915. After preliminary explanatory matter, such as a method of classification to be applied to each fleet described, notes and abbreviations used in the tables, a summary of the fighting fleets of the world, etc., descriptions are given of the naval vessels of the various nations, arranged alphabetically by country, including class of vessel, names, place and date of laying down and launching, dimensions, displacement, power, types of engines, kind of armor used, armament, trial speeds, etc. There are also descriptions of the various types of naval guns manufactured by different firms, a list of dry docks in Europe, Asia, Africa, America, Oceanica and Australasia, including type, dimensions, etc., conversion tables of measures, plans of battleships and armored cruisers of the navies of the different nations, arranged alphabetically by country, and an index of names of ships mentioned in the text.

* Unless otherwise specified, books in this list have been donated by the publishers.

**POCKET COMPANION FOR THE USE OF ENGINEERS, ARCHITECTS AND BUILDERS, 1915**

Containing Useful Information and Tables Pertaining to the Use of Steel Manufactured by Dorman, Long & Co., Limited, Middlesbrough, England. Computed and Edited by the Constructional Department. Leather, 6½ x 4½ in., illus., 40 + 273 pp. Middlesbrough, William Appleyard and Sons, Limited, 1915. (Donated by Dorman, Long & Co., Limited.)

This book, the preface states, contains a full description of the products of each department of the Dorman, Long & Co., Limited, properties in various places, consisting of steel furnaces, rolling mills, structural and bridge shops, wire and wire rod mills, and rail, billet, bloom and slab mills, etc. The subject-matter, it is said, has been prepared and arranged for convenient reference in accordance with the best modern practice, to meet the requirements of engineers, architects, and those engaged in structural engineering, shipbuilding, and allied trades. The text is illustrated and contains tables giving dimensions, properties, etc., of the products described, and it is hoped that the book will be found useful by those requiring material manufactured by the company or engaged in designing structures for which its products are adapted. The Contents are: Notes on Sections; Dimensions, Properties, etc., of Sections; Information Relating to the Carrying Capacity, etc., of Beams, Compound Girders, Stanchions, Struts, Roof Trusses, Plate Girders and Troughing, with Standard Details; Sheet Department: Steel and Iron Sheets, Corrugated, Curved and Plain; Wire and Rod Department: Rolling Mills, Wire Drawing and Galvanizing Shops; Open-Hearth Steel: Specialities; Rolled Sections; General Information, Formulas, Tables, etc.; Index.

**OXY-ACETYLENE WELDING AND CUTTING**

Including the Operation and Care of Acetylene Generating Plants and the Oxygen Process for Removal of Carbon. By Calvin F. Swingle. Cloth, 6¾ x 4½ in., illus., 190 pp. Chicago, Frederick J. Drake & Co., 1915. $1.50.

Practically all metals, the preface states, are now welded by the oxy-acetylene flame, and manufacturers, contractors, etc., are said to be adding the process to their equipment because of its cheapness and speed over old methods. The author, in this book, has endeavored, it is stated, to cover every practical point in the process of welding and cutting and the removal of carbon with oxygen. The principal kinds of welding, such as fire welding, welding by water gas, thermit welding, brazing, and blowpipe welding, are described briefly, and their advantages and disadvantages are discussed. Sufficient theory is included in the subject-matter, it is said, to enable the practical man to acquire a thorough understanding of the subject, as well as numerous illustrations of distinct advantage to the operator. The Chapter headings are: Welding; Welding Flames; Oxygen; Acetylene; Acetylene Gas Purification and Handling; Oxy-Acetylene Torches; Characteristics of Welding Torches; Welding Installations; Preheating and Annealing; Operating a Welding Installation; Metal Welding Practice; Oxy-Acetylene Cutting; Oxygen Carbon Removal; Index.

Gifts have also been received from the following:

Aeronautical Soc. of Am. 1 pam.
Alabama-R. R. Comm. 1 bound vol.
Aldershot Gas, Water & Dist. Lighting Co. 1 pam.
Am. Assoc. of Park Supts. 1 pam.
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Johnson, James W. 1 pam.
Kansas-Public Utilities Comm. 1 vol.
Kansas City, Mo.-Dept. of Water-Works. 1 vol.
Kentucky-Geol. Survey. 3 vol., 3 maps.
Lehigh Univ. 1 pam.
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London & South Western Ry. Co. 1 pam.
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McClure, Frederick A. 1 pam.
Maine-Public Utilities Comm. 1 bound vol.
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Massachusetts-Free Public Library Comm. 1 pam.
Massachusetts-Public Service Comm. 1 bound vol., 2 pam.
Massachusetts-Secy. of the Commonwealth. 1 bound vol., 2 pam.
Melrose, Mass.-City Clerk. 1 vol.
Minnesota, Univ. of. 8 pam.
Missouri, Univ. of.-School of Mines and Metallurgy. 1 pam.
Montana-Dept. of Agriculture and Publicity. 1 pam., 1 map.
Montreal, Que.-City Clerk. 1 bound vol.
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Nebraska-Forestation Comm. 1 pam.
Nebraska-State Geol. Survey. 2 vol.
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New Jersey-Forest Park Reservation Comm. 2 pam.
New Jersey-Public Utility Commrs. 1 bound vol.
New Jersey-State Civ. Service Comm. 1 vol.
New Orleans, La.-Sewerage and Water Board. 1 pam.
New York City-Commr. of Public Works. 1 bound vol.
New York State-Public Service Comm., First Dist. 1 pam.
New York State-Public Service Comm., Second Dist. 1 bound vol., 12 pam.
New York-State Botanist. 1 pam.
New York-State Comm. of Highways. 1 bound vol.
New York-State Library. 1 pam.
New York Chamber of Commerce. 1 bound vol.
North Carolina-Corporation Comm. 1 bound vol.
North Carolina-Geol. and Economic Survey. 2 vol.
North Dakota-State Engr. 1 pam.
North Dakota-Tax Comm. 1 pam.
Ohio-Agricultural Exper. Station. 1 vol.
Ohio-State Geol. Survey. 1 bound vol.
Ohio-State Highway Dept. 1 vol.
Oklahoma, Univ. of. 1 vol.
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Oregon-State Library. 1 pam.
Pennsylvania-Dept. of Forestry. 1 pam.
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Philadelphia, Pa.-Bureau of Highways and Street Cleaning. 1 vol.
Philadelphia, Pa.-Bureau of Surveys. 1 bound vol.
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Philadelphia Rapid Transit Co. 1 pam.
Philippine Islands-Weather Bureau. 1 pam.
Portland, Me.-Dept. of Public Works. 1 pam.
Porto Rico-Bureau of Weights and Measures. 3 pam.
Quebec, Canada-Dept. of Colonisation, Mines, and Fisheries. 1 pam.
Quebec, Canada-Dept. of Mines. 1 pam.
Rhode Island-Harbors Commrs. 1 pam.
St. Louis, Mo.-Water Commr. 1 bound vol.
St. Paul, Minn.-City Comptroller. 1 vol.

Scott, Dunbar D. 1 vol.
Smith, George E. P. 1 pam.
Smithsonian Institution. 1 bound vol.
Société Générale Chemins de Fer Economiques. 2 pam.
Soc. of Ry. Club Secretaries. 1 pam.
Somerville, Mass.-Water Commr. 1 pam.
Stiles, Arthur Alvord. 1 pam.
Svenska Teknologforeningen. 1 pam.
Switzerland-Abteilung für Landeshydrographie. 2 vol.
Sydney, Univ. of. 1 bound vol.
Taylor, A. Merritt. 1 pam.
Texas, Univ. of. 1 pam.
Titanium Alloy Mfg. Co. 2 pam.
Transvaal-Rand Water Board. 1 pam.
Tulane Univ. of Louisiana. 1 vol.
United Eng. Soc. 1 bound vol.
U. S.-Bureau of Foreign and Domestic Commerce. 1 bound vol., 2 pam.
U. S.-Bureau of Lighthouses. 1 pam.
U. S.-Bureau of Mines. 1 vol., 1 pam.
U. S.-Bureau of Standards. 1 pam.
U. S.-Bureau of the Census. 3 bound vol.
U. S.-Coast and Geodetic Survey. 1 chart.
U. S.-Dept. of Agriculture. 47 pam.
U. S.-Dept. of the Interior. 4 pam.
U. S.-Geol. Survey. 5 vol., 24 pam., 1 map.
U. S.-Interstate Commerce Comm. 4 pam.
U. S.-National Museum. 1 vol.
U. S.-Panama Canal. 1 pam.
U. S.-Senate. 1 vol.
U. S.-War Dept. 1 vol.
U. S.-Weather Bureau. 1 vol.
Universidad Nacional de la Plata. 1 pam.
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Utah-State Engr. 1 vol.
Virginia-State Corporation Comm. 1 bound vol.
Washington-Secy. of State. 1 bound vol.
West Virginia, Univ. of. 1 pam.
Western Australia-Water Supply, Sewerage and Drainage Dept. 2 vol.
White, D. M. 1 pam.
Wisconsin-Highway Comm. 1 pam.
Wisconsin, Univ. of. 2 vol.

## BY PURCHASE

**Manual of Agricultural Chemistry.** By Herbert Ingle. Third Edition. New York and London, 1913.

**Lathes: Their Construction and Operation.** By George W. Burley. New York and London, 1915.

**Masonry as Applied to Civil Engineering.** Being a Practical Treatise on the Design and Construction of Engineering Works in Stone and Heavy Concrete. By F. Noel Taylor. New York, 1915.

**A Study of the Circular-Arc Bow-Girder.** By A. H. Gibson and E. G. Ritchie. New York, 1915.

**Single-Phase Electric Railways.** By Edwin Austin. New York, 1915.

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## SUMMARY OF ACCESSIONS

(From July 26th to September 1st, 1915)

| | |
|---|---|
| Donations (including 15 duplicates) | 367 |
| By purchase | 5 |
| Total | 372 |

## MEMBERSHIP

(From August 6th to September 2d, 1915)

### ADDITIONS

| | | Date of Membership. |
|---|---|---|
| **MEMBERS** | | |
| CROWE, FRANCIS TRENHOLM. Constr. Engr., Boise Project, U. S. Reclamation Service, Boise, Idaho | Assoc. M.<br>M. | May 3, 1910<br>July 7, 1915 |
| ELROD, HENRY EXALL. Cons. Engr., Southwestern Life Bldg., Dallas, Tex | Assoc. M.<br>M. | Nov. 7, 1906<br>July 7, 1915 |
| **ASSOCIATE MEMBERS** | | |
| BERGMAN, HARRY MONTEFIORE. Supt., Godwin Constr. Co., 251 Fourth Ave. (Res., 615 West 143d St.), New York City | Jun.<br>Assoc. M. | May 4, 1909<br>Aug. 31, 1915 |
| CULLEY, MASSENA LARON. Civ. and Municipal Engr., 672 North St., Jackson, Miss | Jun.<br>Assoc. M. | Dec. 5, 1911<br>Mar. 2, 1915 |
| FERRY, DOUGLASS HEWITT. 209 Owl Drug Bldg., San Diego, Cal | | Mar. 2, 1915 |
| GLENN, RUSSELL VERSTILLE. Capitol City Club, Atlanta, Ga | | June 3, 1915 |
| GOODMAN, CHARLES. Asst. Engr., Board of Water Supply, City of New York, 10 Beach 43d St., Edgemere, N. Y. | | June 3, 1915 |
| GRODSKE, WALTER JOHN. Asst. Engr., Bureau of Public Works, Manila, Philippine Islands | | Oct. 7, 1914 |
| JACOB, CLARENCE CECIL. Dist. Engr., Water Resources Branch, U. S. Geological Survey, 417 Fleming Bldg., Phœnix, Ariz | | April 7, 1915 |
| NORRIS, JOHN ALEXANDER. Wharton, Tex | | Mar. 2, 1915 |
| ROBSON, RALPH EWART. Res. Engr., Colony Holding Corporation, Atascadero, Cal. | Jun.<br>Assoc. M. | Oct. 3, 1911<br>June 3, 1915 |
| STACK, JAMES RAYMOND. Engr. and Contr. (Stack Constr. Co.), 306 Sellwood Bldg., Duluth, Minn | | April 7, 1915 |
| VROMAN, GUY. Asst. Designing Engr., Board of Water Supply, City of New York, Larchmont, N. Y. | | Mar. 2, 1915 |
| **JUNIORS** | | |
| DREYFUS, SAMUEL CELLNER. Box 10, Tavares, Fla | | June 3, 1915 |
| HEINONEN, HENRY JALMAR. 154 Halsey St., Brooklyn, N. Y. | | April 7, 1915 |
| LATHROP, HENRY MONROE. Eng. Draftsman, C. R. R. of N. J., 143 Liberty St. (Res., 39 Charles St.), New York City | | June 3, 1915 |
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DEATHS

BRACKETT, DEXTER. Elected Member, June 6th, 1888; died August 26th, 1915.

COHEN, MENDES (*Past-President*). Elected Member, December 4th, 1867; died August 13th, 1915.

GRETH, JOHN CHARLES WILLIAM. Elected Member, March 4th, 1913; died August 7th, 1915.

TERRY, HIRAM EVERETT. Elected Member, June 6th, 1911; died March 8th, 1915.

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**Total Membership of the Society, September 2d, 1915, 7 793.**

## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(July 26th to September 1st, 1915)

NOTE.—*This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

### LIST OF PUBLICATIONS

*In the subjoined list of articles, references are given by the number prefixed to each journal in this list:*

(1) *Journal,* Assoc. Eng. Soc., St. Louis, Mo., 30c.
(2) *Proceedings,* Engrs. Club of Phila., Philadelphia, Pa.
(3) *Journal,* Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal,* Western Soc. of Engrs., Chicago, Ill., 50c.
(5) *Transactions,* Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly,* Columbia Univ., New York City, 50c.
(7) *Gesundheits Ingenieur,* München, Germany.
(8) *Stevens Institute Indicator,* Hoboken, N. J., 50c.
(9) *Engineering Magazine,* New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, 432 Fourth Ave., New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News,* New York City, 15c.
(14) *Engineering Record,* New York City, 10c.
(15) *Railway Age Gazette,* New York City, 15c.
(16) *Engineering and Mining Journal,* New York City, 15c.
(17) *Electric Railway Journal,* New York City, 10c.
(18) *Railway Review,* Chicago, Ill., 15c.
(19) *Scientific American Supplement,* New York City, 10c.
(20) *Iron Age,* New York City, 20c.
(21) *Railway Engineer,* London, England, 1s. 2d.
(22) *Iron and Coal Trades Review,* London, England, 6d.
(23) *Railway Gazette,* London, England, 6d.
(24) *American Gas Light Journal,* New York City, 10c.
(25) *Railway Age Gazette,* Mechanical Edition, New York City, 20c.
(26) *Electrical Review,* London, England, 4d.
(27) *Electrical World,* New York City, 10c.
(28) *Journal,* New England Water-Works Assoc., Boston, Mass., $1.
(29) *Journal,* Royal Society of Arts, London, England, 6d.
(30) *Annales des Travaux Publics de Belgique,* Brussels, Belgium, 4 fr.
(31) *Annales* de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand, Brussels, Belgium, 4 fr.
(32) *Mémoires et Compte Rendu des Travaux,* Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil,* Paris, France, 1 fr.
(34) *Portefeuille Economiques des Machines,* Paris, France.
(35) *Nouvelles Annales de la Construction,* Paris, France.
(36) *Cornell Civil Engineer,* Ithaca, N. Y.
(37) *Revue de Mécanique,* Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways,* Paris, France.
(39) *Technisches Gemeindeblatt,* Berlin, Germany, 0, 70m.
(40) *Zentralblatt der Bauverwaltung,* Berlin, Germany, 60 pfg.
(41) *Electrotechnische Zeitschrift,* Berlin, Germany.
(42) *Proceedings,* Am. Inst. Elec. Engrs., New York City, $1.
(43) *Annales des Ponts et Chaussées,* Paris, France.
(44) *Journal,* Military Service Institution, Governors Island, New York Harbor, 50c.
(45) *Colliery Engineer,* Scranton, Pa., 25c.
(46) *Scientific American,* New York City, 15c.
(47) *Mechanical Engineer,* Manchester, England, 3d.
(48) *Zeitschrift,* Verein Deutscher Ingenieure, Berlin, Germany, 1, 60m.
(49) *Zeitschrift für Bauwesen,* Berlin, Germany.
(50) *Stahl und Eisen,* Düsseldorf, Germany.
(51) *Deutsche Bauzeitung,* Berlin, Germany.
(52) *Rigasche Industrie-Zeitung,* Riga, Russia, 25 kop.
(53) *Zeitschrift,* Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria, 70h.
(54) *Transactions,* Am. Soc. C. E., New York City, $12.
(55) *Transactions,* Am. Soc. M. E., New York City, $10.
(56) *Transactions,* Am. Inst. Min. Engrs., New York City, $6.

(57) *Colliery Guardian,* London, England, 5d.
(58) *Proceedings,* Engrs.' Soc. W. Pa., 2511 Oliver Bldg., Pittsburgh, Pa., 50c.
(59) *Proceedings,* American Water-Work Assoc., Troy, N. Y.
(60) *Municipal Engineering,* Indianapolis, Ind., 25c.
(61) *Proceedings,* Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *Steel and Iron,* Thaw Bldg., Pittsburgh, Pa., 10c.
(63) *Minutes of Proceedings,* Inst. C. E., London, England.
(64) *Power,* New York City, 5c.
(65) *Official Proceedings,* New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting,* London, England, 6d.
(67) *Cement and Engineering News,* Chicago, Ill., 25c.
(68) *Mining Journal,* London, England, 6d.
(69) *Der Eisenbau,* Leipzig, Germany.
(71) *Journal,* Iron and Steel Inst., London, England.
(71a) *Carnegie Scholarship Memoirs,* Iron and Steel Inst., London, England.
(72) *American Machinist,* New York City, 15c.
(73) *Electrician,* London, England, 18c.
(74) *Transactions,* Inst. of Min. and Metal., London, England.
(75) *Proceedings,* Inst. of Mech. Engrs., London, England.
(76) *Brick,* Chicago, Ill., 20c.
(77) *Journal,* Inst. Elec. Engrs., London, England, 5s.
(78) *Beton und Eisen,* Vienna, Austria, 1, 50m.
(79) *Forscherarbeiten,* Vienna, Austria.
(80) *Tonindustrie Zeitung,* Berlin, Germany.
(81) *Zeitschrift für Architektur und Ingenieurwesen,* Wiesbaden, Germany.
(82) *Mining and Engineering World,* Chicago, Ill., 10c.
(83) *Gas Age,* New York City, 15c.
(84) *Le Ciment,* Paris, France.
(85) *Proceedings,* Am. Ry. Eng. Assoc., Chicago, Ill.
(86) *Engineering-Contracting,* Chicago, Ill., 10c.
(87) *Railway Engineering and Maintenance of Way,* Chicago, Ill., 10c.
(88) *Bulletin* of the International Ry. Congress Assoc., Brussels, Belgium.
(89) *Proceedings,* Am. Soc. for Testing Materials, Philadelphia, Pa., $5.
(90) *Transactions,* Inst. of Naval Archts., London, England.
(91) *Transactions,* Soc. Naval Archts. and Marine Engrs., New York City.
(92) *Bulletin,* Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.
(93) *Revue de Métallurgie,* Paris, France, 4 fr. 50.
(95) *International Marine Engineering,* New York City, 20c.
(96) *Canadian Engineer,* Toronto, Ont., Canada, 10c.
(98) *Journal,* Engrs. Soc. Pa., Harrisburg, Pa., 30c.
(99) *Proceedings,* Am. Soc. of Municipal Improvements, New York City, $2.
(100) *Professional Memoirs,* Corps of Engrs., U. S. A., Washington, D. C., 50c.
(101) *Metal Worker,* New York City, 10c.
(102) *Organ für die Fortschritte des Eisenbahnwesens,* Wiesbaden, Germany.
(103) *Mining and Scientific Press,* San Francisco, Cal., 10c.
(104) *The Surveyor and Municipal and County Engineer,* London, England, 6d.
(105) *Metallurgical and Chemical Engineering,* New York City, 25c.
(106) *Transactions,* Inst. of Min. Engrs., London, England, 6s.
(107) *Schweizerische Bauzeitung,* Zürich, Switzerland.
(108) *Iron Tradesman,* Atlanta, Ga., 10c.
(109) *Journal,* Boston Soc. C. E., Boston, Mass., 50c.
(110) *Journal,* Am. Concrete Inst., Philadelphia, Pa., 50c.
(111) *Journal of Electricity, Power and Gas,* San Francisco, Cal., 25c.
(112) *Internationale Zeitschrift für Wasser-Versorgung,* Leipzig, Germany.
(113) *Proceedings,* Am. Wood Preservers' Assoc., Baltimore, Md.

## LIST OF ARTICLES

**Bridges.**

New-Old Theory of Reinforced Concrete Beams in Bending.* L. J. Mensch. (110) Dec., 1914.
Report of Committee on Reinforced Concrete Highway Bridges and Culverts. (Am. Concrete Inst.) (110) Feb.
Tests of Beam Connections.* C. S. Whitney. (36) May.
The Franklin Avenue-Louisiana Street Bridge for the City of Houston, Texas.* J. L. Jacobs. (36) May.
Wood Block and Granite for Bridge Floors.* Edward A. Byrne. (Paper read before the Am. Road Builders' Assoc.) (60) June.
Ohio River Bridge for the C., B. & Q. R. R.* (13) July 29.
Canal Bridges.* E. A. Cross. (11) Serial beginning July 30.
Surfacing Bridges.* Frank R. Lander. (60) Aug.
A Long Span Deck Girder Bascule Bridge.* (87) Aug.

* Illustrated.

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Reconstruction of Piers of Little Rock Junction Bridge Across the Arkansas River at Little Rock, Ark.* (86) Aug. 4.
The Chesapeake & Ohio Northern Railway Bridge Over the Ohio River at Sciotoville, Ohio.* (86) Aug. 4.
Reconstruction of Mississippi River Bridge at Keokuk.* (13) Aug. 5.
An Ornamental and Cheap Concrete Bridge.* R. C. Hardman. (13) Aug. 5.
Canadian Pacific Draw Span Over the Lachine Canal.* (15) Aug. 6.
Reinforced-Concrete Arch Bridge has Stone Facing.* (14) Aug. 7.
Diagrams Facilitate Estimating Highway Bridges.* G. F. Burch. (14) Aug. 7.
Allowing for Impact in Bridge Calculations.* J. D. W. Ball. (12) Aug. 13.
A New Bridge Over the Missouri River at Kansas City.* (15) Aug. 13.
Solid Deck Trestles and Bridges on the Illinois Central.* (15) Aug. 13.
Direct-Lift Span Provides 55-Foot Clearance over Louisville and Portland Canal.* (14) Aug. 14.
A Simple Method for Determining Two-Hinged Arch Reactions.* C. S. Whitney. (86) Aug. 18.
Erection of Steel Arch Span, Detroit-Superior Viaduct.* (13) Aug. 19.
Recent Cylinder Pier Construction.* J. E. Bebb. (15) Aug. 20.
Renewing a Busy Main Line Bridge on the Santa Fe.* L. C. Lawton. (15) Aug. 20.
The Chattanooga Creek Bridge of the N. C. & St. L.* C. H. Johnson. (15) Aug. 20.
Erection at Hell Gate Arch Checks Calculations.* (14) Aug. 21.
Paving Problems of Queensboro Bridge, New York.* (13) Aug. 26.
Building Concrete Caissons in the Platte River.* J. H. Merriam. (15) Aug. 27.
Unit-Construction System Applied to a Three-Mile Concrete Viaduct to Reduce the Cost.* (14) Aug. 28.
Elastic Curve Applied to the Design of the Sciotoville Bridge.* D. B. Steinman. (14) Aug. 28.
Le Viaduc en Béton de Tunkhannock du Lackawanna Railroad, à Nicholson (Pennsylvania, E.-U.).* P. Calfas. (33) Aug. 7.
Calcul et Expérimentation des Poutres Solidaires de leurs Supports.* P. Caufourier. (33) Aug. 7.
Neues Verfahren zur raschen Ermittelung der Abmessungen und Eiseneinlagen von Gewölbefugen.* R. Färber. (51) Sup. No. 13, 1915.
Eisenbahnbrücke über die Saar bei Völklingen mit anschliessender Hochbahn.* H. Dürr. (51) Serial beginning Sup. No. 14, 1915.

**Electrical.**

The Relative Migration Velocities of the Ions in Complex Electrolytes. A. Mutscheller. (105) July.
Predetermination of the Residual Flux in Magnets.* Kenelm Edgcumbe. (73) July 16.
Resistance of Carbon Contacts in the Solid Back Transmitter.* A. L. Clark. (Abstract from *Physical Review.*) (73) July 16.
Units from Refuse. A. J. Abraham. (26) July 16.
The Central Power Station of the Randfontein Estates.* R. Turnbull Mawdesley. (26) July 16.
A Comparison of Different Methods of Testing Electrical Porcelain.* A. Chernyshoff and C. A. Butman. (Abstract from the *Electric Journal.*) (73) July 16.
Electric Control-Gear for Air-Compressor Motor.* (11) July 16.
The Electric Crane Applied to the Handling of Coal and Ore.* H. H. Broughton. (73) Serial beginning July 23.
The Weaverham and District Electricity Supply.* (26) July 23.
On an Unbroken Alternating Current for Cable Telegraphy.* George O. Squier. (Paper read before the Physical Soc. of London.) (26) Serial beginning July 30.
A 200-Mile Artificial Transmission Line. C. E. Magnusson, J. Gooderham and R. Rader. (From the *Electrical World.*) (73) July 30.
The Measurement of Self-Induction, an Alternate-Current Bridge.* D. Owen. (73) July 30.
A Short Method for Calculating Starting Resistance.* B. W. Jones. (From the *General Electric Review.*) (73) July 30.
Mobile Color and Stage Lighting.* Bassett Jones. (27) Serial beginning July 31.
Virginia Power Company's Cabin Creek Plant.* (27) July 31.
The Effect of Transient Voltages on Dielectrics.* F. W. Peek, Jr. (42) Aug.
Modern Theories of Magnetism.* George Flowers Stradling. (3) Aug.
Overhead Electrolysis and Porcelain Strain Insulators.* S. L. Foster. (42) Aug.
How Bell Invented the Telephone. Thomas A. Watson. (42) Aug.
Delta-Cross Connections of Transformers for Parallel Operation of Two and Three-Phase Systems.* George P. Roux. (42) Aug.

* Illustrated.

**Electrical—(Continued).**

Experimental Researches on Skin Effect in Conductors.* A. E. Kennelly, F. A. Laws and P. H. Pierce. (42) Aug.
Abnormal Voltages in Transformers. J. Murray Weed. (42) Aug.
Harmonics in Transformer Magnetizing Currents. J. F. Peters. (42) Aug.
The Trend of Electrical Development. Paul M. Lincoln. (42) Aug.
Physical Limitations in D. C. Commutating Machinery. B. G. Lamme. (42) Aug.
The Automatic Switchboard Telephone System of Los Angeles, Cal.* W. Lee Campbell. (42) Aug.
A Large Electric Hoist.* Wilfred Sykes. (42) Aug.
New Carquinez Straits High-Tension Crossing.* (13) Aug. 5.
The Electrical Design of Induction Motors.* H. L. Smith. (Paper read before the Rugby Eng. Soc.) (73) Serial beginning Aug. 6.
Coupled Oscillatory Circuits and the System à Onde Unique. G. W. O. Howe. (73) Serial beginning Aug. 6.
Insulating Properties of Solid Dielectrics.* Harvey L. Curtis. (Abstract from *Bulletin*, Bureau of Standards.) (73) Serial beginning Aug. 6.
Electrically Driven Sawmills.* (111) Aug. 7.
Wireless Call Devices.* L. B. Turner. (Abstract of paper read before the Institution of Post Office Elec. Engrs.) (73) Aug. 13.
Some Points in Transformers.* W. E. Burnand. (73) Aug. 13.
Sag-Tension Calculations. Harold Pender. (27) Aug. 14.
Operating Features of a Small Plant.* (27) Aug. 14.
Motors Simplify Operations in Milk Depot.* J. L. Wiltse. (27) Aug. 14.
Construction of a Vibrating Rectifier.* Charles Fraasa. (19) Aug. 14.
Current-Limiting Reactors.* W. H. Dann and H. H. Rudd. (Abstract of paper read before the Ohio Soc. of Mech., Elec. and Steam Engrs.) (64) Aug. 17.
Havana Consolidated Power Plant.* C. W. Ricker. (64) Aug. 17.
Saving $1 500 a Month by Using Electric Pumps.* E. E. Yensel. (27) Aug. 21.
Central-Station Rate Making. Paul J. Kiefer. (64) Aug. 24.
Electrostatic Potential and Synchronism Indicators.* (64) Aug. 24.
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Power-Station Economics. E. J. Billings. (Paper read before the Missouri Public Utilities Comm.) (64) Aug. 31.
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**Mechanical.**

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The Layout of Concrete Products Plants.* E. S. Hanson. (110) Dec., 1914.

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Uses of the Grinding Wheel.* B. F. Jacobs. (108) July.
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Bearings of Electrical Machinery.* Andrew Gibson. (Paper read before the Assoc. of Min. Elec. Engrs.) (47) July 16.
Coking and By-Product Installation at Victoria Works, Ebbw Vale.* (22) July 16.
Waste-Heat Boilers in Steel Plants.* C. J. Bacon. (Paper read before the Am. Iron and Steel Inst.) (47) July 16.
Firebrick for Boiler Settings. William A. Heisel. (Abstract of paper read before the Ohio Soc. of Mech., Elec. and Steam Engrs.) (47) July 16.
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Battery Vehicles as an Adjunct to Tramways. W. H. L. Watson. (Abstract of paper read before the Tramways and Light Railways Assoc.) (47) July 30.
Electric Vehicles for Collection of Town's Refuse.* J. Jackson. (Report to the Birmingham Corporation Refuse Disposal Dept.) (73) July 30.
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Causes and Prevention of Clinker.* L. Rankin. (64) Aug. 31.
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**Metallurgical.**

The Treatment of Complex Ores by the Ammonia-Carbon Dioxide Process. S. E. Bretherton. (56) Vol. 49, 1914.
The Descriptive Technology of Gold and Silver Metallurgy. A. W. Allen. (56) Vol. 49, 1914.
The Dorr Hydrometallurgical Apparatus.* John Van N. Dorr. (56) Vol. 49, 1914.
The Slime-Concentrating Plant at Anaconda.* Frederick Laist and Albert E. Wiggin. (56) Vol. 49, 1914.
Development of the Round Table at Great Falls.* Arthur Crowfoot. (56) Vol. 49, 1914.
Unit Construction Costs from the New Smelter of the Arizona Copper Co., Ltd.* E. Horton Jones. (56) Vol. 49, 1914.
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Leaching Experiments on the Ajo Ores.* Stuart Croasdale. (56) Vol. 49, 1914.
Basic-Lined Converter Practice at the Old Dominion Plant.* L. O. Howard. (56) Vol. 49, 1914.
Lead-Matte Converting at Tooele. Oscar M. Kuchs. (56) Vol. 49, 1914.
Effects of the Bag House on the Metallurgy of Lead.* L. Douglass Anderson. (56) Vol. 49, 1914.
The Bag House in Lead Smelting.* H. H. Alexander. (56) Vol. 49, 1914.
Electrical Flume Precipitation at Garfield.* W. H. Howard. (56) Vol. 49, 1914.
The International Lead Refining Plant.* G. P. Hulst. (56) Vol. 49, 1914.
Lead Smelting at East Helena. Edgar L. Newhouse, Jr. (56) Vol. 49, 1914.
Electrostatic Separation at Midvale.* H. A. Wentworth. (56) Vol. 49, 1914.
Separation of Lead, Zinc, and Antimony Oxides. Richard D. Divine. (56) Vol. 49, 1914.

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Experimental Leaching at Anaconda. Frederick Laist and Harold W. Aldrich. (56) Vol. 49, 1914.
Precipitation of Copper from Solution at Anaconda.* Frederick Laist and F. F. Frick. (56) Vol. 49, 1914.
Melting of Cathode Copper in the Electric Furnace. Dorsey A. Lyon and Robert M. Keeney. (56) Vol. 49, 1914.
Economy and Efficiency in Reverberatory Smelting. C. D. Demond. (56) Vol. 49, 1914.
The Treatment of Copper Ore by Leaching Methods. W. L. Austin. (56) Vol. 49, 1914.
Curves for the Sensible-Heat Capacity of Furnace Gases.* C. R. Kuzell and G. H. Wigton. (56) Vol. 49, 1914.
A Comparison of the Huntington-Heberlein and Dwight-Lloyd Processes. W. W. Norton. (56) Vol. 49, 1914.
Nodulizing Blast-Furnace Flue Dust. Lawrence Addicks. (56) Vol. 49, 1914.
Smelting Lead Ores in the Blast Furnace. Irving A. Palmer. (56) Vol. 49, 1914.
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Metal Loss in Copper Slags.* Frank E. Lathe. (16) Serial beginning Aug. 7.
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**Mining.**

The Ajo Copper-Mining District.* Ira B. Joralemon. (56) Vol. 49, 1914.
Mining Methods at the Copper Queen Mines.* Joseph P. Hodgson. (56) Vol. 49, 1914.
The Drumlummon Mine, Marysville, Mont.* Charles W. Goodale. (56) Vol. 49, 1914.
Copper Ores of the New London Mine.* B. S. Butler and H. D. McCaskey. (56) Vol. 49, 1914.

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Methods and Economies in Mining.* Carl A. Allen. (56) Vol. 49, 1914.
Dip Chart (Used in Making Vertical Sections of Ore Deposits in Mines).* Howland Bancroft. (56) Vol. 49, 1914.
"Playa" Panning on the Conca River.* William F. Ward. (56) Vol. 49, 1914.
Mining Claims Within the National Forests. E. D. Gardner. (56) Vol. 49, 1914.
Rope Idlers in the Raven Shaft.* George A. Paskard. (56) Vol. 49, 1914.
The Design, Construction and Cost of Two Mine Bulkheads.* Sidney L. Wise and Walter Strache. (56) Vol. 49, 1914.
Ancient Auriferous Gravel Channels of Sierra County, California.* Mark N. Alling. (56) Vol. 49, 1914.
The Winding-Drums of Practice and of Theory; with Notes on Factors of Safety and Economy of Winding-Ropes.* H. W. G. Halbaum. (Paper read before the North of England Inst. of Min. and Mech. Engrs.) (106) Vol. 49, Pt. 3.
Notes on Sampling. T. W. D. Gregory. (Paper read before the North Staffordshire Inst. of Min. and Mech. Engrs.) (106) Vol. 49, Pt. 3.
Modern Developments in Hydraulic Stowing with Suggestions for Its Application in the Staffordshire and District Coal Field, and the Recovery of Abandoned Coal. J. Drummond Paton. (Paper read before the South Staffordshire and Warwickshire Inst. of Min. Engrs.) (106) Vol. 49, Pt.3.
An Auxiliary Aid Outfit for Attachment to Self-Contained Rescue-Apparatus.* Michael McCormick. (Paper read before the Min. Inst. of Scotland.) (106) Vol. 49, Pt. 3.
Rescue-Station Organization; the Resident Brigade System *versus* the System of Non-Resident Brigades. Henry Briggs. (Paper read before the Min. Inst. of Scotland.) (106) Vol. 49, Pt. 3.
The Drift-Deposits of Prestwich, Manchester and Neighbourhood.* J. E. Wynfield Rhodes. (Paper read before the Manchester Geol. and Min. Soc.) (106) Vol. 49, Pt. 3.
Mining in Burma.* C. W. Chater. (Paper read before the North of England Inst. of Min. and Mech. Engrs.) (106) Vol. 49, Pt. 3.
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The Influence of Moisture in the Air on Mine Ventilation. Arthur C. Whittome. (Paper read before the South African Institution of Engrs.) (22) July 30.
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Effectual Sealing of Water Dams.* Frank H. Waterhouse. (Paper read before the National Assoc. of Colliery Managers.) (45) Aug.
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Reinforced Concrete Pavements and Roadways. B. S. Pease. (110) Feb. 1914.
Some Essential Requirements in Concrete Pavements. R. C. Stubbs. (110) Feb. 1914.
Construction and Maintenance of New York State Highways. Arthur H. Blanchard. (6) Jan.
Proposed Revised Standard Specifications for Two-Course Concrete Street Pavements.* (Am. Concrete Inst.) (110) Jan.
Proposed Standard Specifications for One-Course Concrete Alley Pavements. (Am. Concrete Inst.) (110) Jan., Mar.
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Proposed Revised Standard Specifications for One-Course Concrete Standard Pavements.* (Am. Concrete Inst.) (110) Jan.
Review of Present Practice in Concrete Road Construction. Percy H. Wilson. (110) Mar.
Description of the Oxford Pike Service Test Concrete Roadway, Philadelphia.* William H. Connell. (110) Mar.
Concrete Roads and Frost Action. Andrew M. Lovis. (110) Mar.
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Some Maintenance Costs. Paul Macy. (36) May.
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Street and Sidewalk Improvement in the United States and Canada. (60) June.
Improvement of Sheridan Road in Highland Park, Ill.* Stanley E. Bates. (60) June.
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Financing and Building a County Highway.* (60) June.
Street Lighting of London.* W. B. Conant. (60) June.
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How Oiled Earth Roads are Built in Kansas. W. S. Gearhart. (14) Aug. 14.
Rattler Test for Paving Brick Abandoned in St. Louis. Mont. Schuyler. (14) Aug. 14.
Progress of State Management of Public Roads.* J. E. Pennybacker. (Abstract of paper from Yearbook, Dept. of Agriculture.) (86) Aug. 18.
Methods and Cost of Laying Asphaltic Wearing Surface on Concrete Pavement, Santa Barbara County, California.* (86) Aug. 18.
Maintenance and Repair of Alphalt Block Pavements.* Edwin J. Morrison. (13) Aug. 19.
Sheepshead Bay Motor Racetrack.* (13) Aug. 19.
Tar, Pitch, and Bitumen in Road Construction. A. Dryland. (Paper read before the Institution of Mun. and County Engrs.) (104) Aug. 20.
Tropical Road Maintenance Complicated by Floods, Philippine Engineers, in Annual Conference, Discuss Means of Preventing Erosion of Surfacing During Periods of Inundation. (14) Aug. 21.
Traffic Investigation in Denver. Roger W. Toll. (17) Aug. 21.
Heavy Traffic. Harcourt E. Clare. (Paper read before the National Road Conference.) (96) Aug. 26.
Urban and Suburban Roads. J. S. Brodie. (Paper read before the Institution of Mun. and County Engrs.) (96) Aug. 26.
Expansion Joints in Granite-Block Pavement. (13) Aug. 26.
Central Plant at Chicago Will Handle Repairs to All City Equipment.* (14) Aug. 28.
Philippine Road Built at High Level to Escape Flood Damage.* (14) Aug. 28.
Stadterweiterungspläne für Königsberg i. Pr.* (51) July 21.
Hamburg und seine Bauten.* (51) Serial beginning July 24.

**Railroads.**

The Bingham and Garfield Railway, a Short Road in Utah with Some Unusual Features.* H. C. Goodrich. (4) June.
Shockless Railroad Crossing. E. S. Cobb. (60) June.
Rail, Wheel, and Axle Specifications.* D. G. K. Burgess. (Paper read before the Am. Bureau of Standards.) (22) July 16.
Baldwin 2-10-2 Locomotive for the Erie Railroad.* (23) July 16.
The Upkeep of Locomotives on Irish Railways. (12) July 16.
The Design and Construction of Small Stations in the U. S. A.* (23) July 23.
The Reinforced Concrete and Brick Roundhouse of the Buffalo, Rochester & Pittsburgh Ry. at Dubois, Pa.* (86) July 28.
New Heavy Electric Railroad Opened in Michigan.* (13) July 29.
London and Port Stanley Railway. (96) July 29.
The Railway Lines of Syria and Palestine.* Lewis R. Freeman. (15) July 30.
Lancashire & Yorkshire Railway Ambulance Train for the Continent.* (23) July 30.
That Terminal Proposition. R. M. Baker. (15) July 30.
Relation Between the Number of Trains and Passing Points.* Paul M. La Bach. (15) July 30.
Efficient Control of Railroad Operations. F. L. Hutchins. (15) July 30.
Effect of Water Level on Superheat.* M. C. M. Hatch. (15) July 30.

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New Tank Locomotives, Furness Railway.* (23) Serial beginning July 30.
The North-Eastern Railway, Its Rise and Development.* W. W. Tomlinson. (23) July 30.
Notes on Transportation in Europe. A. Stucki. (From paper read before the Railway Club at Pittsburgh.) (15) July 30.
The Counterbalancing of Locomotives.* S. G. Thomson. (Paper read before the Am. Ry. Master Mechanics' Assoc.) (18) July 31.
The Lake Erie & Eastern R. R.* (18) July 31.
Some Features of Engine House Design.* Byron Bird. (From the *Wisconsin Engineer.*) (18) July 31.
Girder and High T-Rail Renewals.* Exum M. Haas. (17) July 31.
Monroe (Tex.) Maintenance Shops.* (17) July 31.
The Recording Accelerometer.* (87) Aug.
Electrification Features and the Talking Signal.* (18) Aug.
Well Car of 200 000 Lb. Capacity.* (25) Aug.
All-Steel Box Car.* (25) Aug.
Long Island Steel Suburban Cars.* (25) Aug.; (15) Aug. 6; (17) July 24.
Bettendorf Cast-Steel Truck (Bogie) Frames.* (21) Aug.
Recent Improvements in the Electric Lighting of Steam Railroad Cars.* R. C. Lamphier. (42) Aug.
Conditions Affecting the Success of Main Line Electrification.* W. S. Murray. (42) Aug.
History of the Suisun Sinks.* A. A. Willoughby. (18) Aug.
Contact Conductors and Collectors for Electric Railways.* C. J. Hixson. (42) Aug.
Contact System of the Butte, Anaconda & Pacific Railway.* J. B. Cox. (42) Aug.
The Modern Electric Mine Locomotive.* Graham Bright. (42) Aug.
Grand Trunk Pacific Ry.* (13) Aug. 5.
New Pittsburgh North Side Freight Station of the P. R. R.* Harvey M. Phelps. (15) Aug. 6.
Locomotive and Train Supplies on the Frisco.* (23) Aug. 6.
Ventilating the Stampede Tunnel of the Northern Pacific.* (15) Aug. 6.
The Operation of the Pacific Electric Railway.* (15) Aug. 6.
New Car Repair Plant, Philadelphia & Reading Ry., St. Clair, Pa.* (18) Aug. 7.
Pacific Type Locomotives for the Chicago, Burlington & Quincy R. R.* (18) Aug. 7; (15) Aug. 13.
London & South-Western Railway Suburban Electrification.* (17) Aug. 7.
Narrow-Gage Cars for the Burma Mines Ry.* F. C. Coleman. (18) Aug. 7.
Fuel Economy on Locomotives.* Wm. Schlafge. (Paper read before the Am. Ry. Master Mechanics' Assoc.) (18) Aug. 7.
Concreting Trains for Track Elevation Work.* (13) Aug. 12.
Diagrams for Cost of Ties; Canadian Pacific Ry.* (13) Aug. 12.
Government Railway of Alaska.* W. R. C. Morris. (96) Aug. 12.
Underground Cable on the Pennsylvania Railroad.* I. C. Forshee. (15) Aug. 13.
Slide Valve Lubrication on the Buffalo, Rochester & Pittsburgh.* (15) Aug. 13.
The Chicago, Milwaukee and St. Paul Electric Locomotives.* (12) Aug. 13.
A Japanese Railway Electrification.* (26) Aug. 13.
Western Railways Get a Small Rate Increase. (15) Aug. 13; (18) Aug. 14.
Heavy Suburban Traffic Tank Locomotives, Grand Trunk Railway.* (23) Aug. 13.
The Norfolk & Western Railroad's Frog and Switch Shop at Roanoke.* (23) Aug. 13.
Relative Merits of Long and Short Wheel Base Scale-Testing Cars.* C. A. Briggs. (Paper read before the National Assoc. of Scale Experts.) (18) Aug. 14; (87) Aug.
Transmission System of the Electrified Divisions, C., M. & St. P. Ry.* R. E. Wade. (From the *Milwaukee Railway System's Employes Magazine.*) (18) Aug. 14.
Railroad Subgrade Troubles, Preventives and Cures. J. T. Bowser. (14) Aug. 14.
Hamilton Electric Inclined Railway. (18) Aug. 14.
Automatic Block Signals for Single-Track Railways.* (13) Aug. 19.
Turning French Freight Cars Into Hospitals.* Walter S. Hiatt. (15) Aug. 20.
Lateral Stresses on Rails in Curved Tracks.* George L. Fowler. (15) Aug. 20.
The Interstate Commerce Commission's Report on Rock Island. (15) Aug. 20.
Automatic Block Signals for Gauntlet in Miraflores Tunnel.* (15) Aug. 20.
Digging Track Ditches.* Kenneth L. Van Auken. (15) Aug. 20.
Laying Rail with the Help of Locomotive Cranes.* (15) Aug. 20.
Designing Manganese Steel Track Work. V. Angerer. (15) Aug. 20.
Passenger Car Roof Construction.* (15) Aug. 20.
Developments at the Grand Central Terminal in New York.* (18) Aug. 21.
Mesaba Railway's New Repair Shops and Office Building.* Gothard Sargl. (17) Aug. 21.
Decision on Anthracite Rate, U. S. Interstate Commerce Comm. (18) Aug. 21; (15) Aug. 20.
Railroad's Maintenance Expenses Allocated Between Freight and Passenger Service. (14) Aug. 21.

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Belt Conveyors will Help Simultaneous Driving and Lining of Air Tunnel.* G. D. Emerson. (14) Aug. 21.
The Locomotive of the Future.* Herbert T. Walker. (46) Aug. 21.
The Rock Island Financing: Report of Interstate Commerce Comm. (18) Aug. 21.
New Specifications for Rails; Pennsylvania R. R. System. (13) Aug. 26.
Notable C. P. R. Tunnels in British Columbia.* (96) Aug. 26.
Plant for Sand Blasting Steel Cars.* (15) Aug. 27; (25) Aug.
New York Freight Terminals, 1914. McCain. (Paper read before the Trunk Line Assoc.) (15) Aug. 27.
Passenger Station of the Chicago Great Western and Chicago, Rock Island & Pacific Railroads at Mason City, Iowa.* Edwin G. Zorn. (18) Aug. 28.
Decapod Locomotives for the Russian State Railways.* (18) Aug. 28.
A Modern Railway School.* (17) Aug. 28.
The Mudge-Slater Spark Arrester.* George W. Bender. (18) Aug. 28.
Extensible Trap Door for Passenger Cars, Pennsylvania R. R.* (18) Aug. 28; (25) Aug.; (15) July 30.
159-Pound Girder Rail for Philadelphia Streets.* (14) Aug. 28
The Walschaert Valve Gear Designed for Variable Lead. Walter Smith. (Abstract of paper read before the International Ry. General Foreman's Assoc.) (18) Aug. 28; (25) Aug.
Steuerstrom-Induktionsmotoren für Schweren Fabrik-und Eisenbahnbetrieb.* F. W. Meyer. (41) Serial beginning July 8.
Probebelastungen auf aufgeschüttetem Sandboden. Johs. Thieme. (51) July 31.
Die elektrische Hauptbahn Kiruna, Riksgränsen.* (41) Serial beginning Aug. 5.
Triebwerkbeanspruchung bei elktr. Lokomotiven.* (107) Aug. 7.

**Railroads, Street.**

Station Entrances on Boston Subways.* W. B. Conant. (60) July.
Battery Vehicles as an Adjunct to Tramways. W. H. L. Watson. (Paper read before the Tramways and Light Rys. Assoc.) (73) July 23.
Stations for Third Track, New York Elevated, Placed above Existing Platforms.* (14) July 31.
Track-Raising in Building a "Hump" Station, New York Elevated Lines.* (13) Aug. 5.
The Electric Railways of London.* (23) Aug. 6.
Another Massachusetts Fare Increase.* (17) Serial beginning Aug. 7.
Route Signs for Surface Cars.* (17) Aug. 14.
Center-Entrance Cars for Suburban Service.* (17) Aug. 14.
Car Service Inspection in Seattle. J. W. McCloy. (17) Aug. 14.
Scientific Coasting at Oakland.* (17) Aug. 14.
Track Renewal Discloses Perfect Condition of 14-Year-Old Granite Pavement.* (14) Aug. 21.
Safety of Trains on the Chicago Elevated.* (17) Aug. 21.
Operating Cost and Shifts in Service.* F. W. Doolittle. (17) Aug. 21.
Reconstruction of Street-Car Tracks at Kansas City, Mo.* E. B. Murray. (13) Aug. 26.
New York Subway Tapped for New Connections while Carrying Heavy Traffic.* (14) Aug. 28.
Cleveland Builds Four Operating Stations.* (17) Aug. 28.
Der Bau von Untergrundbahnen in Berlin.* Guntram Mahir. (53) Serial beginning July 23.

**Sanitation.**

Draining Kerr Lake. Robert Livermore. (56) Vol. 49, 1914.
Investigation of the Durability of Cement Drain Tile in Alkali Soils.* R. J. Wig. G. M. Williams, and others. (110) Feb., 1914.
Results of Tests on Plain and Reinforced Concrete Tile. George P. Dieckmann. (110) Feb., 1914.
Specifications for Drain Tile. A. Marston. (110) Feb., 1914.
Garbage and Refuse Collection and Disposal in St. Louis, Mo. (60) June.
The East Side Levee and Sanitary District.* T. N. Jacob. (Paper read before the Engrs.' Club of St. Louis.) (1) July.
The Sludge Problem, Standards for Effluents Recommended by the Royal Commission and the New Method of Sewage Purification by Means of Activated Sludge and Aëration. Maclean Wilson. (Paper read before the Assoc. of Managers of Sewage Disposal Works.) (104) July 16.
Non-Septic House and Town Sewage Drainage and Sewage-Drainage Ventilation Systems.* Isaac Shone. (Paper read before the Institution of Mun. and County Engrs.) (104) July 16.
Discharge of Open Rectangular Channels.* G. S. Coleman. (104) July 23.

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**Sanitation—(Continued).**

Seven Years' Experience with a Large Sludge-Pressing Plant. John T. Thompson. (Paper read before the Assoc. of Managers of Sewage Disposal Works.) **(104)** July 23.
Design Feature of New Sewerage System and Sewage Disposal Works for Cleburne, Texas. R. E. McDonnell. **(86)** July 28.
Brooklyn Sewage-Aëration and Activated-Sludge Experiments.* E. J. Fort, **(13)** July 29.
Method of Adjusting Sewage Sprinklers.* A. T. Nabstedt. **(13)** July 29.
New Type of Pick-Up Street Sweeper.* **(13)** July 29.
Central Station Heating with Forced Hot Water.* **(101)** Serial beginning July 30.
Brief Notes of Experiments in Sewage Purification by Forced Aëration. J. P. Wakeford. (Paper read before the Institution of Mun. and County Engrs.) **(104)** July 30; **(96)** Aug. 12.
Sewage Disposal at Southall-Norwood.* Reginald Brown. (Paper read before the Institution of Mun. and County Engrs.) **(104)** July 30.
Plumbing Work in Kentucky High School.* **(101)** July 30.
Leeds Main Sewerage and Sewage Disposal.* **(104)** July 30.
Beat Scheduled Time Five Months in Building Huge de la Brea Sewer.* **(14)** July 31.
The Heating Value of Exhaust Steam.* David Moffat Myers. (Paper read before the Am. Soc. of Heating and Ventilating Engrs.) **(9)** Aug.
Method and Cost of Making a Drainage Survey for the Washington Bayou Drainage District, Mississippi.* O. W. Melin. **(86)** Aug. 4.
Constructing an Outfall Sewer at Canton, Ohio.* **(13)** Aug. 5.
Additions to the Baltimore Sewage-Works.* **(13)** Aug. 5.
New Municipal Bath Houses in Ohio City.* **(101)** Aug. 6.
Low-Lift Screw Pumps Installed at Terrebonne, La.* **(13)** Aug. 12.
Automatic Sewage-Pumping and Metering Station.* Allan A. Wood. **(13)** Aug. 12.
Sediment Deposits in Stove Waterbacks.* **(101)** Aug. 13.
Installing a Half-Mile Sewer System, Gilbert, Minn. **(13)** Aug. 19.
A Variable-Capacity Hotel Sewage-Treatment Plant.* George L. Robinson. **(13)** Aug. 19.
Chlorine Control Apparatus for Water and Sewage Purification. **(96)** Aug. 19.
Kingston-Upon-Thames Sewage Disposal Works.* R. Hampton Clucas. **(104)** Aug. 20.
Heating Equipment of Federal Building (Denver, Col.).* **(101)** Aug. 20.
Circular Sewers *versus* Egg-Shaped, Catenary and Horseshoe Cross-Sections.* R. deL. French. **(14)** Aug. 21.
Laying Submerged Outfall Sewer in Surf.* A. J. Cleary. **(13)** Aug. 26.

**Structural.**

The Use of Concrete in Hydraulic Works.* Richard L. Humphrey. **(110)** Feb., 1914.
Modern Concrete Work Without Forms. James E. Payne. **(110)** Dec., 1914.
A Critical Review of Current Practice in Reinforced Concrete Designs as Embodied in Building Regulations and the Joint Committee Report.* Edward Godfrey. **(110)** Dec., 1914.
The Properties of Portland Cement Having a High Magnesia Content.* P. H. Bates. **(110)** Dec., 1914.
Proposed Revised Recommended Practice for Concrete Architectural Stone, Building Block and Brick. (Am. Concrete Inst.) **(110)** Jan.
Proposed Recommended Practice for Concrete Fence Posts. (Am. Concrete Inst.) **(110)** Jan.
Proposed Standard Specifications for Portland Cement Stucco on Wood Lath. (Am. Concrete Inst.) **(110)** Jan.
Some Further Results Obtained in Investigating the Properties of Portland Cements Having a High MgO Content.* P. H. Bates. **(110)** Jan.
Test of a Reinforced Concrete Slab.* E. B. McCormick. **(110)** Jan.
Report of Committee on Reinforced Concrete and Building Laws.* (Am. Concrete Inst.) **(110)** Feb.
Detailed Information Submitted by Committee on Edison Fire.* (Am. Concrete Inst.) **(110)** Feb.
Strength of Concrete Forms.* H. S. Taft. **(110)** Feb.
The Progress of a Decade (in Cement).* Richard L. Humphrey. **(110)** Mar.
Pressures on Piles Supporting Masonry.* R. P. V. Marquardsen. **(4)** June.
Gravel Aggregate for Concrete.* W. K. Hatt. (Paper read before the Indiana Sand and Gravel Producers' Assoc.) **(60)** July.
Housing for Mining Towns.* Joseph H. White. (Abstract from *Bulletin* 87, U. S. Bureau of Mines.) **(22)** July 16.
Designing a Steel Dome.* A. W. Earl and Thomas F. Chace. **(13)** July 29.
Colorizing: a Protective Treatment for Metals.* H. B. C. Allison and L. A. Hawkins. (From the *General Electric Review.*) **(17)** July 30.
40 000-Ton Railroad Icehouse, Electrically Operated.* **(14)** July 31.

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Economics of Concrete Construction.* De Witt V. Moore. (Paper read before the Indiana Eng. Soc.) (67) Aug.
A Comparison of the Properties of a Nickel, Carbon, and Manganese Steel Before and After Heat Treatment.* Robert R. Abbott. (55) Aug.
The Effect of the End Connections on the Distribution of Stress in Certain Tension Members.* Cyril Batho. (3) Aug.
Inside Facts About Stucco. Ralph L. Shainwald. (67) Aug.
High Stresses Carried by Heavy Riveted Truss.* (14) Aug. 7.
Panama-Pacific Exposition.* F. R. Low. (64) Serial beginning Aug. 10.
Design, Construction, and Cost of a 137-ft. Reinforced Concrete Chimney at Coldwater, Mich. Keller E. Morton. (Paper read before the Michigan Eng. Soc.) (86) Aug. 11.
Concreting Plant for Large Chicago Warehouse.* (13) Aug. 12.
London County Hall.* (12) Aug. 13.
Points Respecting Reinforced Concrete for Roads, Sewerage, Etc.* Arthur E. Collins. (Paper read before the Institution of Mun. and County Engrs.) (104) Aug. 13.
Load Tests on Brick Piers.* (13) Aug. 15.
The Two-Family House Built of Hollow Tile. (76) Aug. 17.
National League Ball Park at Boston, Mass.* (13) Aug. 19.
Sheepshead Bay Motor Racetrack.* (13) Aug. 19.
Pile Tests Indicate Type of Substructure for Technology Buildings.* Charles T. Main and H. E. Sawtell. (14) Aug. 21.
Protecting Buildings Against Lightning.* George H. Armstrong. (27) Aug. 21.
Five Examples of Cantilevered Auditorium Balconies.* (14) Aug. 21.
Old Steel of Razed Building Examined for Rust. (14) Aug. 21.
Slope-Deflection Method Reduces Time for Wind Stress Analysis.* W. M. Wilson and G. A. Maney. (14) Aug. 21.
Concrete Dome for the New Technology Building.* (13) Aug. 26.
Metallic Preservative Coatings. E. H. Fish. (72) Aug. 26.
Reinforcing Concrete Columns to Carry Additional Stories.* Paul R. Prufert. (13) Aug. 26.
Piledriving Destroys a Tunnel by Clay Pressure.* (13) Aug. 26.
Moments at Eccentric Heel-Joints of Roof Trusses.* Edward Godfrey. (13) Aug. 26.
Cleveland Bases Stairway Regulations on Studies.* (14) Aug. 28.
Water-Soaked Bed of Blue Clay Caused Landslip at Cement Plant near Hudson.* D. H. Newland. (14) Aug. 28.
Time and Shrinkage Affect Stresses and Deflections of Reinforced-Concrete Beams.* F. R. McMillan. (14) Aug. 28.
Comparison of Chimney Sizes. J. C. Lathrop. (64) Aug. 31.
L'Attaque de l'Aluminium par l'Acide Nitrique. A. Trillat. (92) May.
Emploi de l'Aluminium dans les Industries Alimentaries. A. Trillat. (92) May.
Tours Réfrigérantes d'Eaux de Condensation, Système Ch. Bourdon.* Ch. Dantin. (33) July 31.
Verwendung von Eisenbeton im Weinbau.* Otto Hausen. (78) July 1.
Unmantelte Spundwandeisen.* W. Gutacker. (78) July 1.
Kritik und Richtigstellung der gebräuchlichen Methoden zur Berechnung von Eisenbetonquerschnitten auf Biegung und Druck.* B. Löser. (78) Serial beginning July 1.
Beitrag zur Statik der Stützengruppen und Traggestelle.* V. Lewe. (78) July 1.
Das Münster in Freiburg und seine Pflege.* (51) Serial beginning July 3.
Der Bismarck-Turm bei Leipzig.* Em. Haimovici. (78) July 3.
Bachs Knickungsversuche mit Eisenbetonsäulen. Max R. v. Thullie. (53) July 9.
Die evangelische Lukas-Kirche zu Frankfurt am Main.* C. F. W. Leonhardt. (51) Serial beginning July 14.
Wirtschaftliche Bemessung von Eisenbetonquerschnitten unter exzentrischem Druck. R. E. Steinsberg. (78) July 15.
Wettbewerb für ein Alters- und Invalidenasyl in Delsberg.* E. Prince, F. Broillet und E. Faesch. (107) July 17.
Zwei beachtenswerte Brucherscheinungen an Konstruktionsteilen.* R. Loebe. (48) July 17.
Kleinwohnungsbauten der Architekten Fritschi & Zangerl, Winterthur.* (107) Serial beginning July 24.
Beanspruchung und Lebensdauer von Drahtseilen für Aufzuge.* O. Wahrenberger. (48) July 24.
Ueber Schlagbeigeproben mit Gusseisen.* A. Gessner. (50) July 29.
Ueber Schulen und Kindergärten der Gemeinde Wien.* Max Fiebeger. (53) Serial beginning July 30.
Sprodigkeit von Flusseisen als eine Folge der Erwärmung gequetschen Materials. Richard Baumann. (48) July 31.

**Topographical.**

New Features in Surveying Instruments.* (13) July 29.

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**Water Supply.**

Proposed Revised Recommended Practice for Plain Concrete Pipe and Drain Tile. (Am. Concrete Inst.) (110) Jan.
Water-Works of Valparaiso, Ind.* E. L. Loomis. (60) July.
The Proposed Missouri-Meramec River Hydro-Electric Power Development. J. A. Ockerson and others. (1) July.
The Globe-Johnston Valveless Air-Pump.* (11) July 23.
The Control of Water Powers. Leonard Lundgren. (111) July 24.
Friction Head in Water Pipe Lines. Geo. A. Ohren. (82) July 24.
Methods Employed in Determining Hydraulic Elements of Unlined Water Tunnel at Rio Janeiro.* R. S. Wark. (From the *Iowa Engineer.*) (86) July 28.
Commission Revises Water Rates in Leavenworth. (13) July 29.
Hydraulic Redevelopment at Turners Falls, Mass.* Howard M. Turner. (13) July 29.
Reinforced Concrete Standpipes. (96) July 29.
Log-Handling Equipment at Arrowrock Dam.* Charles H. Paul. (13) July 29.
New Filtration Works for Oldham.* (12) July 30.
Salt Solution Method Used for Testing Centrifugal Pump.* Ben D. Moses. (14) July 31.
Reinforced-Concrete Tank of 100 000-Gal. Capacity Designed by Use of Diagrams.* A. R. James. (14) July 31.
Construction Methods Used in Building Parkersburg Reservoir.* L. E. Chapin. (14) July 31.
Recorder for Measuring Flow Over Weirs.* (25) Aug.; (96) Aug. 5.
Prescribed Water-Works Operating Methods in West Virginia. West Virginia Public Service Commission. (86) Aug. 4.
Irrigation Weir, Measuring Rod and Discharge Card.* Kenneth A. Heron. (13) Aug. 5.
Siphon Spillway for Power Dam.* T. K. Mathewson. (13) Aug. 5.
Sixty-Seven Breaks in a Cast-Iron Water Main.* C. E. Davis. (13) Aug. 5.
The Excess Lime Method of Water Purification.* A. C. Houston. (From Report to the Metropolitan Water Board.) (12) Aug. 6.
Self-Cleaning Strainer for Circulating Water.* (11) Aug. 6.
Swedish Government Builds Hydro-electric Plant above the Arctic Circle.* (14) Serial beginning Aug. 7.
Columbus Experts Determine *B. Coli* Vagaries; Testing Methods and Relative Counts for Various Stages of the Purified Waters Compared for a Two-Year Period. (14) Aug. 7.
Life of Wood Pipe. D. C. Henny. (From the *Reclamation Record.*) (14) Aug. 7; (13) Aug. 26.
An Electrically Driven Water-Works Plant.* E. M. Ivens. (64) Aug. 10.
Method and Cost of Waterproofing Settling Basin Bottoms at St. Louis. (86) Aug. 11.
Design and Construction of the Lake Watrous Dam of the New Haven Water Co.* Clarence M. Blair. (Paper read before the Connecticut Soc. of Civ. Engrs.) (86) Aug. 11.
Design of 2 500 000-Gal. Steel Standpipe at West Roxbury, Mass. (86) Aug. 11.
Erie Rainstorm and Flood.* (13) Aug. 12.
Evaporation and Seepage from Irrigation Reservoirs.* Kenneth A. Heron. (13) Aug. 12.
Stripping Water-Works Reservoirs.* (13) Aug. 12.
An Earthquake-Proof Concrete Tower. (13) Aug. 12.
The Selection of Deep Well Pumping Machinery. Douglas A. Graham. (Paper read before the Illinois Soc. of Engrs. and Surveyors.) (12) Aug. 13.
Electrical Pumping for Irrigation.* (73) Aug. 13.
Getting the Proper Vacuum in Summer.* (Operating Requirements of Cooling Systems.) J. Wilmore. (27) Aug. 14.
Federal and State Control of Water-Power.* Leonard Lundgren. (27) Aug. 14.
Conduits for Water.* George J. Henry. (111) Aug. 14.
Minneapolis Loses Filter Infringement Suit. (14) Aug. 14.
The Water Softener in Feed-Water Treatment.* H. R. Dorman. (Paper read before the Eng. Service Club.) (64) Aug. 17.
Design and Construction of the New 500 000-Gal. Elevated Water Tank at Appleton, Wis.* D. D. Williams. (86) Aug. 18.
Data on the Life of Wooden Pipe Pertaining to 79 Pipe Lines. (86) Aug. 18.
Chlorine Control Apparatus for Water and Sewage Purification.* (96) Aug. 19.
Deep Trenches for Reservoirs.* J. M. M. Greig. (96) Aug. 19.
Rebuilding the Omaha Water-Intake Cribs.* Geo. T. Prince. (13) Aug. 19.
Water Undertakings of England and Wales. (104) Serial beginning Aug. 20.
Hydraulic Turbines.* H. J. Kennedy. (19) Aug. 21.
Saline Method of Water Flow Measurement.* W. D. Peaslee. (111) Serial beginning Aug. 21.
Irrigation Methods in the Orient.* Robert Sibley. (111) Aug. 21.
Pennsylvania Commission Issues Rules Regarding Dams.* (14) Aug. 21.

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The Functions of a Water System with Respect to Domestic Service and Fire Protection. E. B. Proctor. (Paper read before the Tri-State Water and Light Assoc.) (86) Aug. 25.
Reinforced-Concrete Tower Tank at Middleborough, Mass.* George A. Sampson. (13) Aug. 26.
Rapid Tunnel Driving under the Bonus System. J. R. McFarland. (13) Aug. 26.
Long-Term Rainfall Records in New York State.* Edward H. Sargent. (13) Aug. 26.
Provo Reservoir Company's Irrigation Project.* Clarence S. Jarvis. (13) Aug. 26.
Springfield Water-Works.* (13) Serial beginning Aug. 26.
Costs of Electric Pumping for Irrigation Tabulated; South Side Unit of Minidoka Project of U. S. Reclamation Service Uses Electricity. (14) Aug. 28.
La Production de l'Electricité dans la Région occidentale des Etats-Unis.* (33) July 24.
Das staatliche Kraftwerk Dörverden a. d. Weser.* Block. (49) Pt. 7.
Die Wasserkräfte des Berg- und Hügellandes in Preussen und ihre Bedeutung für die Elektrizitätserzeugung. Br. Thierbach. (41) July 8.
Wie bewegt sich fliessendes Wasser.* Hans Roth. (107) July 10.
Ueber Zusammenhang zwischen Leistung und Umlaufzahl bei Wasserturbinen. A. Strickler. (107) Serial beginning July 24.
Einiges über Bau und Berechnung von Stauwehr-Anlagen.* H. E. Gruner. (107) Aug. 14.

**Waterways.**

Kiel; Its Naval and Engineering Features.* A. Wharton Metcalfe. (12) July 16.
Chicago Municipal Pier.* (13) July 29.
Water Storage on the St. Maurice River, Quebec. (96) July 29.
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